MDSS Technology

pentra 80

Technical Manual

P/n: RAA022AA

ABX HORIBA
DIAGNOSTICS

1. Revisions

Table 1: Table of Revisions

Index	P/N revision	Software revision	Section	Date
RAA022AA	RAH912AA	≤ V1.01	All	31/03/02

This document applies to the latest higher software version.

When a subsequent software version changes the information in this document, a new issue will be released.

1.1. Notice of liability

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2. Working conditions

2.1. Environment

The Pentra 80 should be operated in an indoor location only. Operation at an altitude over 3000 meters (9800 feet) is not recommended. Instrument is designed to be safe for transient voltages according to INSTALLATION CATEGORY II and POLLUTION DEGREE 2.

Please ask your *ABX Diagnostics* representative service center for any information about the operating location when it does not comply with the recommended specifications.

2.2. Location

The Pentra 80 should be placed on a clean and leveled table or work station. Please note that the Pentra 80, printer and reagents weigh approximately 40 kilograms (88 lbs). Avoid exposure to sunlight. Proper ventilation requires that a space of at least 20 cm (8 inches) must be left behind the instrument.

2.3. Grounding

Proper grounding is required. Check that the wall ground (earth) plug is correctly connected to the laboratory grounding electricity installation.

If there is no ground then use a ground stake. Current electricity Standards must be applied.

2.4. Humidity and temperature conditions

The Pentra 80 must function between 16 to 34°C (61 to 93°F). Maximum relative humidity 80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F). If it is kept at a temperature of less than 10°C (50°F), the instrument should be allowed to sit for an hour at the correct room temperature before use.

2.5. Electromagnetic environment check

The Pentra 80 as been designed to produce less than the required level of electromagnetic interferences in order to operate in conformity with its destination. The electromagnetic interferences caused by the Pentra 80 are limited to a level allowing the correct operation of other instruments in conformity with their destination.

In case of problems, check that the instrument is not placed in proximity of electromagnetic fields, or short wave emissions (radars, X-rays, scanner, etc...).

2.6. Environment protection

Used accessories and consumables must be collected by a laboratory specialized in elimination and recycling of this kind of material according to the legislation.

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HORIBA
DIAGNOSTICS

1. Technical specifications

1.1. Parameters

Table 1: CBC Mode

WBC	White Blood Cell
RBC	Red Blood Cell
Hgb	Hemoglobin Concentration
Hct	Hematocrit
MCV	Mean Corpuscular Volume
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
RDW	Red Distribution Width
PLT	Platelets
PDW	Platelets Distribution Width
MPV	Mean Platelet Volume
PCT	Plateletcrit

Table 2: CBC + 5DIFF Mode

WBC	White Blood Cell
LYM	Lymphocytes % and #
MON	Monocytes % and #
NEU	Neutrophils % and #
EOS	Eosinophils % and #
BAS	Basophils % and #
LIC	Large Immature Cell % and #
ALY	Atypical Lymphocytes % and #
RBC	Red Blood Cell
Hgb	Hemoglobin Concentration
Hct	Hematocrit
MCV	Mean Corpuscular Volume
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
RDW	Red Distribution Width
PLT	Platelets
PDW	Platelets Distribution Width
MPV	Mean Platelet Volume
PCT	Plateletcrit

1.2. Throughput Analyses

- 80 samples per hour.

1.3. Tube identification

- By mean of Keyboard, internal and external Barcode.

1.4. Reagents

- ABX DILUENT (20 Litres).
- ABX CLEANER (1 Litre, Integrated).
- ABX EOSINOFIX (1 Litre, Integrated).
- ABX BASOLYSE (1 Litre, Integrated).
- ABX ALPHALYSE (0.4 Litre, Integrated).

1.5. Internal Computer

- Color LCD touch screen: 12 inches.
- Industrial PC board Windows NT 4.0.
- Processor frequency ..... Celeron 433 MHz.
- Memory capacity.......................... 128 Mo.
- Hard drive....................................... 10 Go.
- Floppy disck.
- CD ROM drive.
- RS 232C.
- Keyboard.
- Mouse.

1.6. Measurements and computation

- Impedance for Wbc, Plt, Rbc, Baso.
- Photometry for Hgb.
- Impedance and light scattering for Lym, Mon; Neu, Eos, Aly and Lic.
- Computation from stored data that was directly measured for Hct, Mcv, Mch, Mchc, Rdw, Mpv, Pct and Pdw.

2. Physical specifications

2.1. Power requirements

- Power supply...... from 100 Vac to 240 Vac.
  ....50 Hz to 60 Hz.
- Power consumption ..... Maximum 230 VA.
- Printer .... Depends of printer.
  ....(See printer’s manual).

2.2. Operating temperature and humidity

- 16 - 34°C (61-93°F) room temperature.
- Maximum relative humidity 80% for temperature up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F).

2.3. Dimension and weight

- Dimensions.......................82 x 57 x 54 cm.
  ....34.1 x 23.3 x 22 in.
- Weight.. 55 Kg.
  ....122 lbs.

2.4. Minimum specimen volume

- CBC Mode (**CBC**) .... 30µl.
- CBC + 5DIFF Mode (**DIF**).................... 53µl.

2.5. dilution ratios

- WBC/BASO...................................... 1/200.
- LMNE .... 1/80.
- RBC/PLT .... 1/10000.
- HGB .... 1/250.

2.6. Hgb measurement

- Hgb chamber, LED 555 nm.
- Modified Drabkin method (cyanmethemoglobin).
- Light source ....Electroluminescent diode.
- Wavelenght .... 550nm +/- 10nm.

2.7. Counting aperture diameters

- WBC/BASO...................................... 80µm.
- LMNE .... 60µm.
- RBC/PLT .... 50µm.

2.8. Reagent consumption (ml)

Table 3: Reagents consumption

Cycles	Estimated duration (s)	Diluent (ml)	Eosinofix (ml)	Basolyse II (ml)	Cleaner (ml)	Lyse (ml)
CBC/DIFF	0’45”	27.4	1.0	2.0	1.0	0.45
CBC	0’45”	24.4	-	2.0	1.0	0.45
Prime DILUENT	3’00”	44	-	-	-	-
Prime EOSINOFIX	1’34”	1.6	23.7	-	-	-
Prime BASOLYSE 2	1’25”	1.7	-	23.7	1.0	-
Prime CLEANER	1’24”	1.7	-	-	24.7	-
Prime LYSE	1’31”	2.7	-	-	-	8.4
Prime ALL	7’13”	50.7	24.0	24.0	25.0	8.4
STARTUP (1 blank cycle)	2’28”	55.2	2.0	3.0	2.0	0.95
SHUT DOWN	2’56”	32.2	1.0	1.0	14.2	0.49
Rinse CYTOMETER	1’14”	5.0	-	-	-	-
AUTOCLEAN	1’33”	27.6	1.0	1.0	1.0	0.50
MINICLEAN	0’21”	10.3	1.0	2.0	1.0	0.33
CONCENTRATED cleaning	4’00”	29.6	1.0	1.0	1.0	0.50
BACKFLUSH	0’24”	-	-	-	-	-

STARTUP cycle estimated duration and consumptions are given for one blank cycle control. It could be a maximum of three cycles.

3. Summary of performance data

3.1. Repeatability

- Based on 10 consecutive samples of the same fresh whole blood sample without alarm:

Table 4: Repeatibility

PARAMETERS	%CV	Test Level
WBC	< 2%	at 10 x 10^3/µL
RBC	< 2%	at 5 x 10^6/µL
Hgb	< 1%	at 15 g/dL
Hct	< 2%	at 45%
Plt	< 5%	at 300 x 10^3/µL

3.2. Linearity

Table 5: Linearity

PARAMETERS	Linearity Range	Difference (Which ever is greater)
WBC (10^3/µL)	0 to 120 x 10^3/µL	+/- 0.3 or +/- 7%
RBC (10^6/µL)	0 to 8 x 10^6/µL	+/- 0.07 or +/- 2%
RBC (10^6/µL)	8 to 18 x 10^6/µL	Reportable range
PLT (10^3/µL)	0 to 1 900 x 10^3/µL	+/- 10 or +/- 7%
PLT Concentrated mode (10^3/µL)	1500 to 5000 x 10^3/µL	+/- 10 or +/- 7 %
HGB (g/dl)	1.3 to 24 g/dl	+/- 0.3 or +/- 2%
HCT (%)	2 to 67 %	+/- 2 or +/- 3%

3.3. Carryover

- Carry-over was tested by analyzing samples with hight concentration of WBCs, RBCs, Hgb and PLTs. Each sample was run in triplicate, followed by three background cycles. The % carryover is calculated using the following formula:

$$\text{Carryover} = \frac{\text{Background1} - \text{Background3}}{\text{Sample3} - \text{Background3}} \text{x}100$$

Table 6: Carryover

	WBC	RBC	Hgb	PLT
Level	43.64	8.56	25.94	739
% Carryover (Actual)	0.00	0.00	0.05	0.28
% Carryover (Claimed)	<0.5%	<0.5%	<0.5%	<0.5%

4. Reagents specification

In order for the instrument to operate correctly, hight-quality reagents must be used.
ABX DIAGNOSTICS provides all the necessary reagents.
All these reagents have been registered by the **A.F.S.S.A.P.S.** «**A**gence **F**rançaise de **S**écurité **S**anitaire des **P**roduits de **S**anté» according to the procedure relative to laboratory reagents used for biological analyses.
These reagents are used for in vitro diagnostics.
All these reagents are manufactured by:

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4.1. ABX DILUENT

- **Function**: This diluent is necessary for the process involved in counting (and differentiating) the blood cells. This reagent is used also to rinse the hydraulic parts of the instrument.
- **Composition**: Stabilized saline solution which contains an organic buffer, an antiseptic and Sodium Azide < 0.1%.
- **Description**: Limpid and odourless aqueous solution.
- **Physico-chemical properties**: Boiling point: About 100°C, pH: neutral.
- **Mesuring Principles**: See user manual.
- **Performances**: See user manual.
- **Results**: See user manual.
- **Directions for use**: See user manual.
- **Handling Precautions**: Avoid skin and eye contact. Use laboratory gloves when handling the reagents. If a large quantity of reagent is ingested a mucous irritation can result.
- **Emergency First aid**: If the eyes or skin come into contact with the reagent, rinse thoroughly with water. If a large quantity is ingested, drink water immediately, and induce vomiting.
- **Storage conditions**: Stored at 18°C (65°F) to 25°C (77°F) away from light.
- **ABX DIAGNOSTICS Part number**: 0901020

4.2. ABX ALPHALYSE

- **Function**: This reagent is used to lyse blood cells and determine hemoglobin concentration.
- **Composition**:The reagent contains potassium cyanide at 0.03%, a quarternary ammonium salt and a saline phosphate buffer containing sodium azide < 0.1%.
- **Description**: Aqueous solution, limpid.
- **Physico-chemical properties**: Boiling point: approximately 100°C. pH: basic, smells of cyanide.
- **Mesuring Principles**: See user manual.
- **Performances**: See user manual.
- **Results**: See user manual.
- **Directions for use**: See user manual.
- **Handling Precautions**: May be dangerous. Avoid contact with eyes, skin and clothing. Wear laboratory gloves when handling the product. The product may be harmful if ingested. The product can be absorbed through an open wound, or inhalation.
- **Emergency First aid**: If the eyes or skin come into contact with the reagent, rinse with water. If the reagent is inhaled, breathe fresh air immediately. If a large quantity is ingested, drink water immediately, and induce vomiting. Call anti-poison center, or contact doctor.
- **Storage conditions**: Stored at 18°C (65°F) to 25°C (77°F) away from light. Product will degrade if exposed to air, keep cap / probe assembly securely tightened.
- **ABX DIAGNOSTICS Part number**: 0906004

4.3. ABX BIOLYSE

- **Function**: This reagent is used to lyse blood cells and determine hemoglobin concentration.
- **Composition**:Quarternary ammonium chloride.

- **Description**: Colorless, odorless.
- **Physico-chemical properties**: pH: 6.65
- **Handling Precautions**: May be dangerous. Avoid contact with eyes, skin and clothing. Wear laboratory gloves when handling the product. The product may be harmful if ingested.
- **Mesuring Principles**: See user manual.
- **Performances**: See user manual.
- **Results**: See user manual.
- **Directions for use**: See user manual.
- **Emergency First aid**: If the eyes or skin come into contact with the reagent, rinse with water. If the product is ingested, call immediately a doctor.
- **Storage conditions**: Stored at 18°C (65°F) to 25°C (77°F) away from light..
- **ABX DIAGNOSTICS Part number**: 0906005

4.4. ABX CLEANER

- **Function**: Washing agent.
- **Composition**: Enzymatic solution with proteolytic action.
- **Description**: Transparent liquid.
- **Physico-chemical properties**: Boiling point: around 100°C. pH: 9.6
- **Handling Precautions**: May be harmful. Avoid contact with eyes, skin and clothing.
- **Mesuring Principles**: See user manual.
- **Performances**: See user manual.
- **Results**: See user manual.
- **Directions for use**: See user manual.
- **Emergency First Aid**: In case the product comes into contact with the eyes, rinse with water. If the product is ingested, call a doctor immediately.
- **Storage conditions**: Stored at 18°C (65°F) to 25°C (77°F).
- **ABX DIAGNOSTICS Part number**: 0903010

4.5. ABX EOSINOFIX

- **Function**: This reagent lyses RBCs, fixes leukocytes and gives a specific coloration to eosinophils.
- **Composition**: Alcoholic solution containing propylene-glycol, a formic dye, buffers, alkaline salts, wetting agents and an aldehyde preservative.
- **Description**: Deep blue aqueous solution, smells of alcohol.
- **Physico-chemical properties**: pH: 6.9
- **Handling precautions**: Avoid contact with eyes, skin and clothing. Wear laboratory gloves when handling the product. The product may be harmful if ingested or inhalted. Keep the bottle closed when not in use.
- **Mesuring Principles**: See user manual.
- **Performances**: See user manual.
- **Results**: See user manual.
- **Directions for use**: See user manual.
- **Emergency First *Aid***: If the eyes or skin come into contact with the reagent, rinse with water. If the reagent is inhaled or ingested, call local anti-poison center or contact doctor.
- **Storage conditions**: Room temperature between 18°C (65°F) to 25°C (77°F).
- **ABX DIAGNOSTICS Part number**: 0206010

4.6. ABX BASOLYSE II

- **Function**: This reagent lyses RBCs for the leukocytes and differential count of the polynuclear basophils.
- **Composition**: Acidic solution containing a lytic agent.
- **Description**: Colorless aqueous solution.
- **Physico-chemical properties**: pH: 2.4
- **Handling precautions**: Avoid contact with eyes, skin and clothing. Wear laboratory gloves when handling the product. The product may be harmful if ingested or inhalated. Keep the bottle closed when not in use.

- **Mesuring Principles**: See user manual.
- **Performances**: See user manual.
- **Results**: See user manual.
- **Directions for use**: See user manual.
- **Emergency First Aid**: If the eyes or skin come into contact with the reagent, rinse with water. If the reagent is inhaled, breath fresh air immediately. If a large quantity is ingested, drink water immediately. Do not induce vomiting. Call local anti-poison center or contact doctor.
- **Storage conditions**: Room temperature between 18°C (65°F) to 25°C (77°F).
- **ABX DIAGNOSTICS Part number**: 0906003

4.7. Waste handling precautions

If required, waste can be neutralized before being discarded. Follow your laboratory's protocol when neutralizing and disposing of waste.

5. Limitations

5.1. Maintenance

In Chapter 8. **Maintenance**, specific maintenance procedures are listed. The maintenance procedures identified are mandatory for proper use and operation of the **ABX PENTRA 80**.

⚠ Failure to execute any of these recommended procedures may result in poor reliability of the system.

5.2. Blood specimens

Verification of any abnormal test result (including flagged results or results outside of the normal range) should be performed using reference methods or other standard laboratory procedures for conclusive verification of the results. The sections below list known limitations of automated blood cell counters which use the principles of impedance and light absorbance as principles of measurement.

5.3. Known interfering substances

WBC:

- **White Blood Cells (Leukocytes)**:WBC results that exceed the linearity limits of the system will require dilution of the blood sample (Leukemia sample followed by a leukopenia). Re-assaying the diluted sample will help to obtain the correct assay value.
- **Unlysed Red Cells** - In some rare instances, the erythrocytes in the blood sample may not be completely lysed. These non-lysed red blood cells may be detected on the WBC histogram with an L1 alarm or as an elevated baseline on the side (leading edge) of the lymphocytes population. Non-lysed erythrocytes will cause a falsely elevated WBC count.
- **Multiple myeloma** - The precipitation of proteins in multiple myeloma patients may give high WBC counts.
- **Leukemia** - A very low WBC count may result from this disease because of possible increased fragility of the leukocytes leading to destruction of some of these cells during counting. These white cell fragments will also interfere with the white cell differential parameters.
- **Chemotherapy** - Cytotoxic and immunosuppressive drugs may increase the fragility of the leukocytes which may cause low WBC counts.
- **Cryoglobulins** - Increased levels of cryoglobulin that may be associated with myeloma, carcinoma, leukemia, macroglobulinemia, lymphoproliferative disorders, metastic tumors, autoimmune disorders, infections, aneurism, pregnancy, thromboembolic phenomena, diabetes, etc, which can increase the WBC, RBC or Plt counts and the Hgb concentration. The specimen must be warmed up to 37°C (99°F) in a bain marie for 30 minutes and analyzed again immediately after (analyzer or manual method).
- **Macrothrombocytes** - in excessive numbers may affect and increase Leukocyte numeration.

RBC:

- **Red Blood Cells (Erythrocytes)**: The red blood cell dilution contains all the formed elements in the blood: erythrocytes, leukocytes and platelets. During erythrocytes counting (red blood cells), platelets are not counted as their size falls below the minimum threshold.
- **Agglutinated erythrocytes** - May cause a low incorrect RBC count. Blood samples containing the agglutinated red blood cells may be suspected by elevated MCH and MCHC values and shown by examination of the stained blood film.
- **Cold agglutinins** - IgM immunoglobulins which are high in cold agglutinin disease may cause lower RBC and Plt counts and increase MCV.

Hgb (Hemoglobin):

- **Turbidity of the blood sample** - Any number of physiological and/or therapeutic factors may produce high incorrect Hgb results. To obtain accurate hemoglobin results when increased turbidity of the blood sample occurs, determine the cause of the turbidity and follow the appropriate method below:
- **High WBC**: An extremely high WBC will cause excessive light scatter. In these cases use reference (manual) methods.The diluted sample should be centrifuged, and the supernatant fluid measured with a spectrophotometer.
- **High lipid concentration**: A high concentration of lipids in the blood sample will give the plasma a «milky» appearance. This condition can occur with hyperlipidemia, hyperproteinemia (as in gammapathies) and hyperbilirubinemia. Accurate hemoglobin determinations can be achieved by using reference (manual) methods and a plasma blank.
- **Increased turbidity** may also be seen in cases where the red blood cells are resistant to lysing. This condition will cause an incorrect high Hgb result, but may be detected by observing the abnormal MCH, MCHC values, and the increased baseline on the leading edge of the WBC histogram. Erroneous hemoglobin results will cause the results of the MCH and MCHC to be incorrect as well.
- **Fetal bloods** - The mixing of fetal and maternal bloods may produce a high inaccurate Hgb value.

Hct (Hematocrit):

- **Red blood cells agglutination** - May produce an inaccurate Hct and MCV values. Red blood cell agglutination may be detected by observing abnormal MCH and MCHC values, as well as by examination of the stained blood film In such cases, manual methods may be required to obtain an accurate Hct value

MCV (Mean Corpuscular Volume):

- **Red blood cell agglutination** - May produce an inaccurate MCV value. Red blood cell agglutination may be detected by observing abnormal MCH and MCHC values, as well as by examination of the stained blood film. In such cases, manual methods may be required to obtain an accurate MCV value.
- **Excessive numbers of large platelets** and/or the presence of an excessively high WBC count may interfere with the accurate determination of the MCV value. In such cases, careful examination of the stained blood film may reveal the error.

MCH (Mean Corpuscular Hemoglobin):

- The MCH is determined according to Hgb value and the RBC count. The limitations listed for the Hgb and RBC will have an effect on the MCH and may cause inaccurate values.

MCHC (Mean Corpuscular Hemoglobin Concentration):

- The MCHC is determined according to the Hgb and Hct values. The limitations listed for the Hgb and Hct will have an effect on the MCHC and may cause inaccurate values.

RDW (Red blood cell Distribution Width):

- The red blood cell distribution width is determined according to the RBC count.
- **Nutritional deficiency or blood transfusion** - May cause high RDW results due to iron and/or cobalamin and /or folate deficiency.

Plt (Platelets):

- **Very small erythrocytes** (microcytes), erythrocyte fragments (schizocytes) and WBC fragments may interfere with the proper counting of platelets and cause elevated Plt counts.
- **Agglutinated erythrocytes** - May trap platelets, causing an erroneously low platelet count. The presence of agglutinated erythrocytes may be detected by observation of abnormal MCH and MCHC values and by careful examination of the stained blood film.
- **Giant platelets in excessive numbers** - may cause a low inaccurate platelet count as these large

platelets may exceed the upper threshold for the platelet parameter and are not counted.

- **Chemotherapy** - Cytotoxic and immunosuppressive drugs may increase the fragility of these cells which may cause low Plt counts. Reference (manual) methods may be necessary to obtain an accurate platelet count.
- **Hemolysis** - Hemolysed specimens contain red cell stroma which may increase platelet counts.
- **A.C.D. blood** - Blood anticoagulated with acid-citrate-dextrose may contain clumped platelet which could decrease the platelet count.
- **Platelet agglutination** - Clumped platelets may cause a decreased platelet count and/or a high WBC count. The specimen should be recollected in sodium citrate anticoagulant to ensure the anticoagulated character depending on agglutination and reanalyzed only for the platelet count. The final Plt result must be corrected for the sodium citrate dilution effect. However, these platelet clumps do trigger flags L1, LL and LL1.

MPV (Mean Platelet Volume):

- **Giant platelets** that exceed the upper threshold of the Platelet parameter may not be counted as platelets. Consequently, these larger platelets will not be included in the instrument’s calculation of Mean Platelet Volume.
- **Very small erythrocytes** (microcytes), erythrocytic fragments (Schizocytes) and white blood cell fragments may interfere with the proper counting and sizing of Platelets.
- **Agglutinated erythrocytes** - May trap Platelets, causing an incorrect MPV result. The presence of agglutinated erythrocytes may be detected by observation of abnormal MCH and MCHC values and by careful examination of the stained blood film.
- **Chemotherapy** - May also affect the sizing of Plts.

Blood samples collected in EDTA will not maintain a stable Mean Platelet Volume. Platelets collected in EDTA swell depending on the time post-collection and storage temperature.

LYM# (Lymphocyte count absolute value), LYM% (Lymphocyte percentage):

- The Lymphocyte count is derived from the WBC count. The presence of erythroblasts, certain parasites and erythrocytes that are resistant to lysis may interfere with an accurate LYM count. Limitations listed for the WBC count pertain to the LYM # and % counts as well.

MON# (mononuclear cell count absolute), MON% (Mononuclear percentage):

- The mononuclear cell count absolute is derived from the WBC count. The presence of large lymphocytes, atypical lymphocytes, blasts and an excessive number of basophils may interfere with an accurate monocyte count.
- Limitations listed for the WBC count pertain to the MON # and % counts as well.

NEU# (neutrophil count absolute), NEU% (Neutrophil percentage):

- The neutrophils cell count is derived from the WBC cell count. The excessive presence of eosinophils, metamyelocytes, myelocytes, promyelocytes, blasts and plasma cells may interfere with an accurate neutrophils count.

EOS# (Eosinophil cell count absolute), EOS% (Eosinophil percentage):

- The eosinophil cell count is derived from the WBC cell count. The presence of abnormal granules (degranulated areas, toxic granules...) may interfere with the eosinophil counting.

BAS# (Basophil cell count absolute), BAS% (Basophil percentage):

- The Basophil cell count is derived from the WBC cell count.

Hydraulic & Pneumatic principles

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1. Hydropneumatic connections

Read this table as follow: LV3_2 means connection to port 2 of valve 3.

Table 1: Hydropneumatic connection

Circuit	From	F.S.	Diameter	Length	T.S.	To
AIR	Atmosphere		2.05	140		LV14_2
	LV14_1		1.52	70		Count syringe_1
	Rinse chamber_1 - Atmos.		2.05	550		LV17_2
	LV17_1		1.52	30		T8_1
	Atmosphere		2.05	80		LV19_1
	LV19_3		1.52	500		Diluent reservoir_2
	LV19_2		1.52	60		T8_3
	T8_2		1.52	230		Drain syringe # 2_1
	Atmosphere		2.05	70		LV21_2
	LV21_1		1.30	185		Isolator_2
	Rinse chamber_2 - Atmos.		2.05	300		LV24_2
	LV24_1		1.52	90		Drain syringe # 1_1
DILUENT REAGENT	ABX Diluent container		C 3x6	maxi. 2000		Diluent input
	Diluent input		2.54	190	S	LV29_2
	LV29_1	S	2.54	180	S	Diluent reservoir_4
			2.05	65		Diluent reservoir_1
	Diluent reservoir_1		2.05	370		LV2_1
	LV2_3	S	2.05	120		LMNE syringe_2
	LV3_2	S	1.52	50	S	LV3_3
	LV3_1	S	1.52	60	S	LV1_3
	LV1_1	S	1.52	200	S	Isolator_1
	Isolator_2	S	1.52	100		T1_1
	T1_2		1.14	35		LMNE flow cell_4
	T1_2		Xba403a			LMNE flow cell_4
	T1_3		1.14	35		LMNE flow cell_2
	T1_3		Xba403a			LMNE flow cell_2
	LV1_2		1.52	300		T6_3
	LV2_2		1.02	175		LMNE syringe_4
	LMNE syringe_1		1.02	205		LMNE flow cell_5
	LMNE flow cell_7		1.02	10		(Cap)
			2.05	65		Diluent reservoir_3
	Diluent reservoir_3		2.05	610		LV10_1
	LV10_3		2.05	160		Reagent syringe_4
	LV10_2		1.52	50		LV11_3
	LV11_1		1.52	15		T5_2
	T5_1		1.52	760		LV22_3
	LV22_1		1.52	50		LV23_3
	LV23_1		1.52	190		T3_1
	T3_3		1.52	75		Probe rinse block_1
	T3_2		1.30	15		Isolator_1
	Isolator_3		1.52	215		LV20_1

Table 1: Hydropneumatic connection

Circuit	From	F.S.	Diameter	Length	T.S.	To
	LV20_2		1.52	760		T7_1
	LV23_2		1.52	300		Probe rinse block_2
	LV22_2		1.02	115		Sample syringe_2
	LV11_2		1.52	440		LV25_3
	LV25_1		1.52	65		LV27_3
	LV27_1		1.52	50		LV26_3
	LV26_1		1.52	200	S	Reagent heater_7
	Reagent heater_8	S	1.52	160		RBC chamber_1
	LV26_2		1.52	260	S	Reagent heater_1
	Reagent heater_2	S	1.52	160		DIL1/HGB chamber_1
	LV27_2		1.52	50		T10_2
	LV25_2		1.52	170		WBC/Baso chamber_4
ABX CLEANER REAGENT	Abx Cleaner bottle		2.05	800		LV8_1
	LV8_3		2.05	160		Reagent syringe_2
	LV8_2		1.52	70		LV6_3
	LV6_1		1.52	300		T10_3
	T10_1		1.52	180		WBC/Baso chamber_1
	LV6_2		1.52	120		T5_3
ABX EOSINOFIX REAGENT	Abx Eosinofix bottle		2.05	800		LV9_1
	LV9_3		2.05	160		Reagent syringe_3
	LV9_2		1.52	550	S	Reagent heater_3
	Reagent heater_4	S	1.52	160		LMNE chamber_3
ABX BASOLYSE II REAGENT	Abx Basolyse II bottle		2.05	800		LV12_1
	LV12_3		2.05	160		Reagent syringe_5
	LV12_2		1.52	575	S	Reagent heater_10
	Reagent heater_9	S	1.52	60	S	Reagent heater_11
	Reagent heater_12	S	1.52	160		WBC/Baso chamber_2
ABX ALPHALYSE REAGENT	Abx Alphalyse bottle		1.52	800		LV7_1
	LV7_3		1.52	160		Reagent syringe_1
	LV7_2		1.52	480		DIL1/HGB chamber_2
SAMPLING	Probe_1		1.02	205		Sample syringe_1
	Probe_1				S	Sample syringe_1
LMNE COUNTING	LMNE chamber_4		1.30	20		M4_2 photocell
	M4_1 photocell		1.30	320		LV4_1
	LV4_2		1.02	130		T2_2
	T2_3		1.02	240		LMNE syringe_5
	LMNE syringe_3		1.02	85		T4_1
	T4_2		1.02	15		LV5_1
	LV5_2		1.52	280		T7_2
	T2_1	S	1.85	10		LMNE flow cell_6
			0.19	4		LMNE flow cell_6

Table 1: Hydropneumatic connection

Circuit	From	F.S.	Diameter	Length	T.S.	To
	LMNE flow cell_output		1.52	20		E1_1 anode fitting
	E1_2 anode fitting		1.52	70		Isolator_1
	Isolator_2		1.52	80		E2_1 ground fitting
	E2_2 ground fitting		1.52	335		LV28_2
	LV28_1		1.52	120		T6_2
	T6_1		1.52	160	S	Reagent heater_5
	Reagent heater_6	S	1.52	160		LMNE chamber_2
WBC/RBC COUNTING	WBC/Baso chamber_3		1.52	200		RBC chamber_3
	RBC chamber_2		1.52	480		LV15_2
	LV15_1		1.52	70		Count syringe_2
WASTE	Rinse chamber_3		2.05	20		Filter_1
	Filter_2		2.05	100		LV31_2
	LV31_1		1.52	30		T12_3
	DIL1/HGB chamber_3		1.52	65		LV32_2
	LV32_1		1.52	15		T12_2
	T12_1		1.52	35	S	T13_3
	RBC chamber_4		1.52	65		LV34_2
	LV34_1		1.52	15		T13_2
	T13_1		1.52	180		M2_1 photocell
	M2_2 photocell		1.52	15		Isolator # 2_1
	Isolator # 2_2		2.05	280		LV30_1
	LV30_3	S	2.54	160	S	Drain syringe # 1_2
	LV30_2	S	2.54	150		T14_3
	LMNE chamber_5		1.52	65		LV33_2
	LV33_1		1.52	60		E3_1
	E3_2		1.52	60		T11_1
	T7_3		1.52	100		T11_3
	T11_2		1.52	15		M1_1 photocell
	M1_2 photocell		1.52	15		Isolator # 1_1
	Isolator # 1_2		2.05	500		LV18_1
	LV18_3		2.05	210		Drain syringe # 2_2
	LV18_2	S	2.54	150		T9_2
	WBC/Baso chamber_5		1.52	50		LV35_2
	LV35_1		1.52	130		M3_1 photocell
	M3_2 photocell		1.52	15		Isolator # 3_1
	Isolator # 3_2		2.05	460		Count syringe_3
	T4_3		1.02	150		LV13_1
	LV13_2		2.05	140		Count syringe_4
	Count syringe_5		2.05	120		LV16_1
	LV16_2	S	2.54	150		T9_3
	T9_1		2.54	225		T14_2
	T14_1		2.54	20		Waste output
	Waste output		C 4x6	maxi. 2000		Waste container

2. Instrument tubing

2.1. Tube list

Table 2: Tube list

Designation	Part Number	Diameter	Length	Quantity	Comment
Y Connector	EAB021A	3		2	
Y Connector	EAB026A	2.5		2	
T410-6 Connector	EAB033A	1.6		2	
T220-6 Connector	EAB035A	2.3		8	
0.040 TYGON tubing	EAE005A	1.02	10	1	
		1.02	15	1	
		1.02	85	1	
		1.02	115	1	
		1.02	130	1	
		1.02	150	1	
		1.02	175	1	
		1.02	205	2	
		1.02	240	1	
0.051 TYGON tubing	EAE006A	1.30	15	1	
		1.30	20	1	
		1.30	185	1	
		1.30	320	1	
0.060 TYGON tubing	EAE007A	1.52	15	7	
		1.52	20	1	
		1.52	30	2	
		1.52	35	1	
		1.52	50	6	
		1.52	60	5	
		1.52	65	4	
		1.52	70	4	
		1.52	75	1	
		1.52	80	1	
		1.52	90	1	
		1.52	100	2	
		1.52	120	2	
		1.52	130	1	
		1.52	160	7	
		1.52	170	1	
		1.52	180	2	
		1.52	190	1	
		1.52	200	3	
		1.52	215	1	
		1.52	230	1	
		1.52	260	1	

Table 2: Tube list

Designation	Part Number	Diameter	Length	Quantity	Comment
		1.52	280	1	
		1.52	300	3	
		1.52	335	1	
		1.52	440	1	
		1.52	480	1	
		1.52	500	1	
		1.52	550	1	
		1.52	575	1	
		1.52	760	2	
		1.52	800	1	
0.081 TYGON tubing	EAE008A	2.05	20	1	
		2.05	65	2	Notched tubing
		2.05	70	1	Notched tubing
		2.05	80	1	Notched tubing
		2.05	100	1	
		2.05	120	2	
		2.05	140	1	
		2.05	140	1	Notched tubing
		2.05	160	4	
		2.05	210	1	
		2.05	280	1	
		2.05	300	1	
		2.05	370	1	
		2.05	460	1	
		2.05	500	1	
		2.05	550	1	
		2.05	610	1	
		2.05	800	3	
CRISTAL tubing	EAE011A	3x6	maxi 2000	1	
CRISTAL tubing	EAE028A	4x6	maxi 2000	1	
0.045 TYGON tubing	EAE033A	1.14	35	2	
0.100 TYGON tubing	EAE034A	2.54	20	1	
		2.54	150	3	
		2.54	160	1	
		2.54	180	1	
		2.54	190	1	
		2.54	225	1	
0.0075 TYGON tubing	EAE047A	0.19	4	1	
0.073 TYGON tubing	EAE048A	1.85	10	1	
Sleevings	GAL098A			30	S2x4 Lg=6 tubing EAE026A
Tube shielding	XBA403A			2	

2.2. Connectors and integrated tubings list

The following table shows the connectors and integrated tubings list: Length x Quantity per diameter.

Table 3: Connectors and integrated tubings list

Designation	Part Number	Diameter	Length	Qty	Comment
Y Connector	EAB021A	3		2	
Y Connector	EAB026A	2.5		2	
T410-6 Connector	EAB033A	1.6		2	
T220-6 Connector	EAB035A	2.3		8	
0.040 TYGON tubing	EAE005A	1.02	1330	1	
0.051 TYGON tubing	EAE006A	1.30	540	1	
0.060 TYGON tubing	EAE007A	1.52	11700	1	
0.081 TYGON tubing	EAE008A	2.05	7240	1	
CRISTAL tubing	EAE011A	3x6	maxi 2000	1	
CRISTAL tubing	EAE028A	4x6	maxi 2000	1	
0.045 TYGON tubing	EAE033A	1.14	70	1	
0.100 TYGON tubing	EAE034A	2.54	1225	1	
0.0075 TYGON tubing	EAE047A	0.19	4	1	
0.073 TYGON tubing	EAE048A	1.85	10	1	
Sleevings	GAL098A			30	S2x4 Lg=6 tubing EAE026A
Tube shielding	XBA403A			2	

3. Function of valves

Table 4: Function of valves

Valve number	Subject	Functions
1	Differencial diluent	Selects flowcell sheath 2 or LMNE chamber
2	Differencial diluent	
3	Differencial diluent	Selects flowcell sheath 1 or sheath 2
4	Flowcell sample supply	Opens pathway from LMNE chamber to flowcell
5	Flowcell sample injector	Opens waste path for sample LMNE syringe
6	Rinse output control	Selects rinse for probe rinse block or WBC\Baso chamber
7	Alphalyse	Control alphalyse entry\exit reagent syringe

Table 4: Function of valves

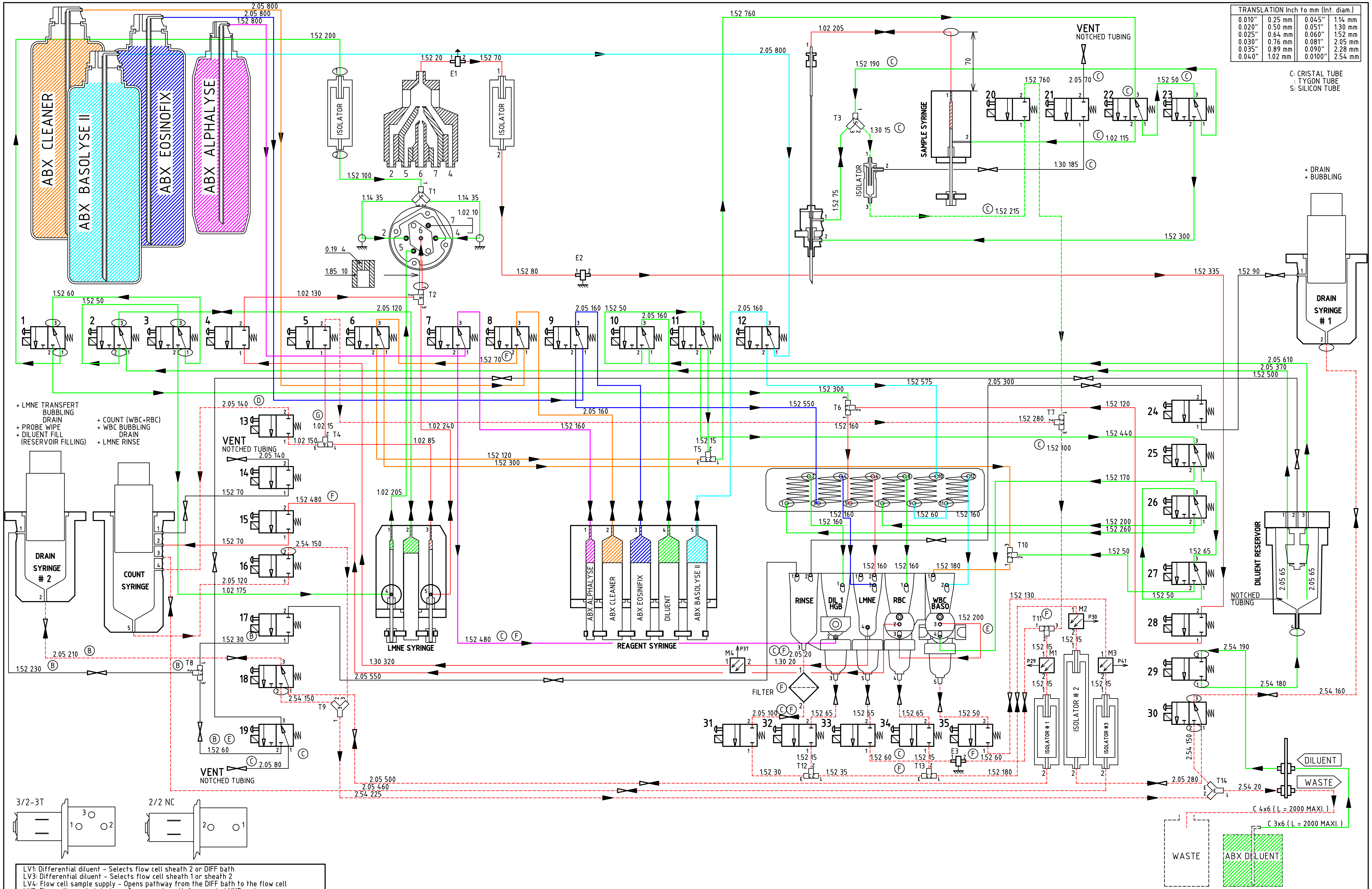
Valve number	Subject	Functions
8	Cleaner	Control cleaner entry\exit reagent syringe
9	Eosinofix	Control eosinofix entry\exit reagent syringe
10	Diluent	Control alphalyse entry\exit reagent syringe
11	Diluent ouput control	Routes diluent to probe rinse block or heating coil
12	Basolyse II	Control basolyse II entry\exit reagent syringe
13	Flowcell rinse	Routes diluent from flowcell and LMNE syringe to counting syringe
14	Counting syringe	Set counting syringe to atmosphere
15	WBC and RBC\Plt count	Opens vacuum count line for WBC and RBC chambers
16	Counting syringe	Drain for counting syringe
17	Draining syringe #2	Set draining syringe #2 to atmosphere (through Rinse chamber)
18	Draining syringe #2	Drain for draining syringe #2
19	Diluent reservoir	Fill diluent tank or set diluent tank to atmosphere
20	Probe	Probe cleaning
21	Probe	Flushing out of probe rinsing block
22	Probe	Direct diluent into interior or exterior of probe
23	Probe	Probe cleaning
24	Draining syringe #1	Set draining syringe #1 to atmosphere (through Rinse chamber)
25	WBC\Baso Counting head	Routes diluent to heating coil or sweep flow for counting head
26	Diluent chamber select	Routes diluent (via heating coil) to Hgb or RBC chamber
27	Diluent circuit	Fill WBC\Baso chamber with diluent
28	Flowcell drain	Opens path from flowcell output to LMNE chamber for drain
29	Diluent circuit	Entry of diluent
30	Counting syringe	Flushing\Draining of the counting syringe
31	Chambers	Drain for rinse chamber
32	Chambers	Drain for first dilution chamber
33	Chambers	Drain for LMNE chamber
34	Chambers	Drain for RBC chamber
35	Chambers	Drain for WBC\Baso chamber

4. Pneumatic diagram

See pneumatic diagram on next page.

TRANSLATION Inch to mm (Int. diam.)			
0.010"	0.25 mm	0.045"	1.14 mm
0.020"	0.50 mm	0.051"	1.30 mm
0.025"	0.64 mm	0.060"	1.52 mm
0.030"	0.76 mm	0.081"	2.05 mm
0.035"	0.89 mm	0.090"	2.28 mm
0.040"	1.02 mm	0.0100"	2.54 mm

C: CRISTAL TUBE
: TYGON TUBE
S: SILICON TUBE


ABX CLEANER
ABX BASOLYSE II
ABX EOSINOFIX
ABX ALPHALYSE
ISOLATOR
E1
E2
E3
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
VENT
NOTCHED TUBING
SAMPLE SYRINGE
DRAIN SYRINGE # 1
DRAIN SYRINGE # 2
COUNT SYRINGE
+ DRAIN
+ BUBBLING
+ LMNE TRANSFERT
BUBBLING
DRAIN
+ PROBE WIPE
+ DILUENT FILL
(RESERVOIR FILLING)
+ COUNT (WBC+RBC)
+ WBC BUBBLING
DRAIN
+ LMNE RINSE
LMNE SYRINGE
REAGENT SYRINGE
ABX ALPHALYSE
ABX CLEANER
ABX EOSINOFIX
DILUENT
ABX BASOLYSE II
RINSE
DIL 1 HGB
LMNE
RBC
WBC BASO
FILTER
M1
M2
M3
M4
P29
P30
P37
P41
ISOLATOR # 1
ISOLATOR # 2
ISOLATOR #3
DILUENT RESERVOIR
NOTCHED TUBING
DILUENT
WASTE
C 4x6 (L = 2000 MAXI.)
C 3x6 (L = 2000 MAXI.)
WASTE
ABX DILUENT
3/2-3T
2/2 NC
1.52 200
1.52 760
2.05 800
1.02 205
1.52 190
1.30 15
1.52 20
1.52 70
1.52 100
1.14 35
1.02 10
0.19 4
1.85 10
1.52 80
1.52 335
1.52 90
1.52 60
1.52 50
1.02 130
2.05 120
2.05 160
2.05 610
2.05 370
1.52 500
1.52 575
2.05 300
1.52 300
1.52 550
1.52 120
1.52 280
1.52 160
1.52 440
1.52 170
1.52 200
1.52 260
1.52 65
1.52 130
2.54 190
2.54 180
2.54 160
2.54 150
2.05 280
2.54 20
2.05 140
2.05 210
1.52 230
1.30 320
2.05 550
2.05 500
2.05 460
2.54 225
2.05 80
1.52 480
2.54 150
1.02 175
1.52 30
1.02 240
1.02 85
1.30 185
1.52 215
1.02 115
2.05 70
70

LV1: Differential diluent – Selects flow cell sheath 2 or DIFF bath
LV3: Differential diluent – Selects flow cell sheath 1 or sheath 2
LV4: Flow cell sample supply – Opens pathway from the DIFF bath to the flow cell
LV5: Flow cell sample injector – Opens waste path for sample LMNE syringe
LV6: Rinse output control – Selects rinse to probe rinse block or WBC/BASO bath
LV11: Diluent output control – Routes diluent to probe rinse block or heating coil
LV13: Flow cell rinse – Routes diluent from flow cell and LMNE syringe to the count syringe
LV15: WBC and RBC/PLT count valve – Opens vacuum count line for WBC and RBC bath
LV17: Waste syringe #2 vent – Opens waste vent (through the rinse chamber)
LV19: Diluent reservoir fill – Opens reservoir vent and fill it with drain syringe #2
LV24: Waste syringe #1 vent – Opens waste vent (through the rinse chamber)
LV25: Sweep flow diluent – Routes diluent to heating coil or sweep flow
LV26: Diluent bath select – Routes diluent (via heating coil) to Hgb or RBC bath
LV28: Flow cell drain: Opens path from flow cell output to DIFF bath for drain

Description	Chk	By	Date	ECR	Rev
Creation according prototype and NML0XXAS-g diagram.	GC	ADC	07/08/02	861	A

Designation: **PENTRA 80**
HYDROPNEUMATIC DIAGRAM
Standard tolerance: – Roughness: –
Material: –
Treatment: –
Coating: –
N° : **NML012A** Sheet: **S** Drw size: **A2** Scale: – Dim. in millimetres

DIAGNOSTICS

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MDSS Technology
pentra 80

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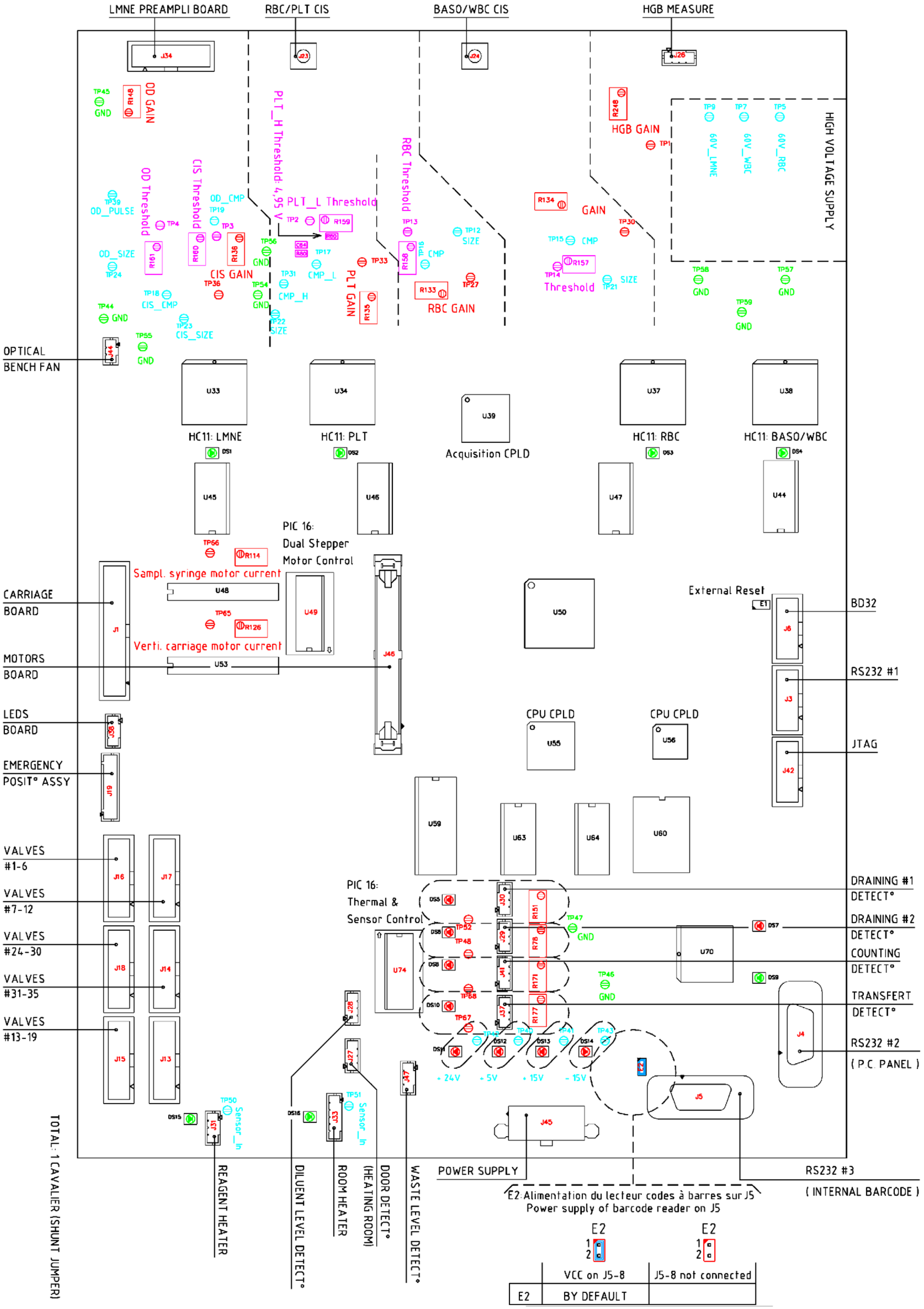
1. Main board

1.1. Main board general view

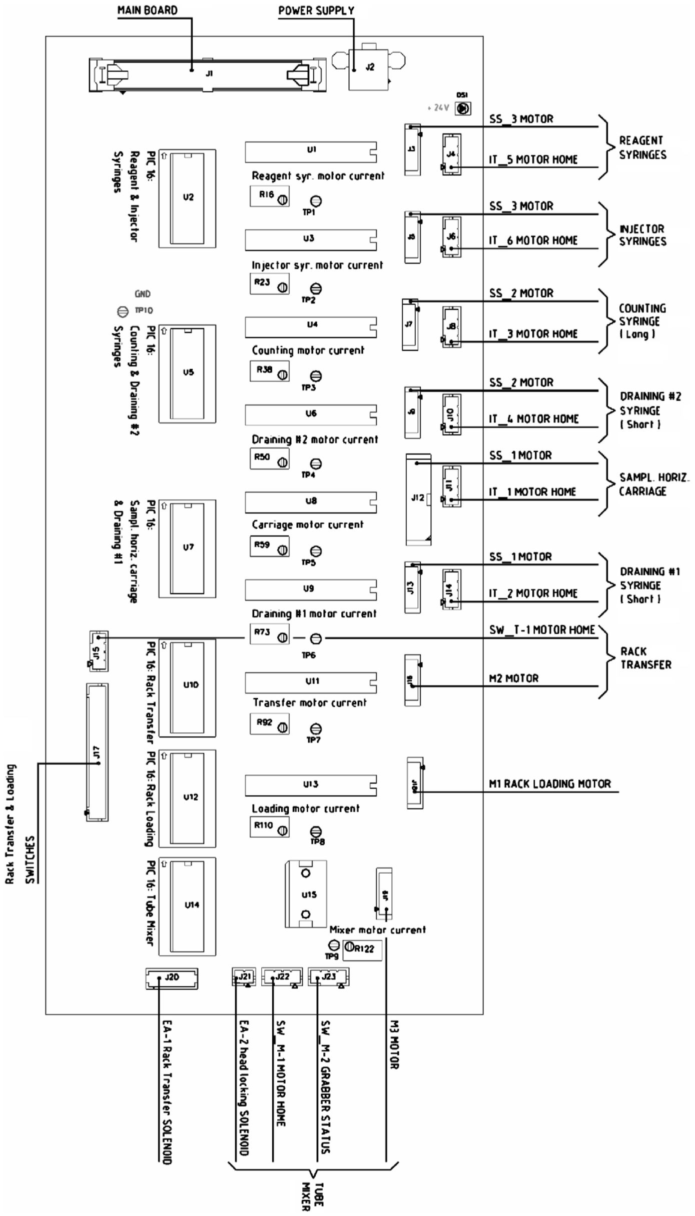

LMNE PREAMPLI BOARD
RBC/PLT CIS
BASO/WBC CIS
HGB MEASURE
J34
J23
J24
J26
OD GAIN
PLT_H Threshold: 4,95 V
RBC Threshold
HGB GAIN
HIGH VOLTAGE SUPPLY
64V_LMNE
64V_WBC
64V_RBC
OD Threshold
CIS Threshold
OD_CMP
OD_PULSE
PLT_L Threshold
GAIN
CMP
SIZE
Threshold
OD_SIZE
CIS GAIN
CMP_L
CMP_H
PLT GAIN
RBC GAIN
CIS_CMP
CIS_SIZE
GND
OPTICAL BENCH FAN
U33
U34
U39
U37
U38
HC11: LMNE
HC11: PLT
Acquisition CPLD
HC11: RBC
HC11: BASO/WBC
U45
U46
U47
U44
PIC 16:
Dual Stepper
Motor Control
Sampl. syringe motor current
U48
U49
Verti. carriage motor current
U53
J46
U50
External Reset
E1
CARRIAGE BOARD
MOTORS BOARD
LEDS BOARD
EMERGENCY POSIT° ASSY
BD32
RS232 #1
JTAG
CPU CPLD
U55
CPU CPLD
U56
U59
U63
U64
U60
VALVES #1-6
VALVES #7-12
VALVES #24-30
VALVES #31-35
VALVES #13-19
J16
J17
J18
J14
J15
J13
PIC 16:
Thermal &
Sensor Control
U74
U70
DRAINING #1 DETECT°
DRAINING #2 DETECT°
COUNTING DETECT°
TRANSFERT DETECT°
RS232 #2
(P.C. PANEL)
J4
J5
J45
+ 24V
+ 5V
+ 15V
- 15V
TOTAL: 1 CAVALIER (SHUNT JUMPER)
REAGENT HEATER
Sensor_In
DILUENT LEVEL DETECT°
ROOM HEATER
(HEATING ROOM)
DOOR DETECT°
WASTE LEVEL DETECT°
POWER SUPPLY
RS232 #3
(INTERNAL BARCODE)
E2: Alimentation du lecteur codes à barres sur J5
Power supply of barcode reader on J5

E2	E2	
	VCC on J5-8	J5-8 not connected
E2	BY DEFAULT	

Diag.1:Main board general view

2. Motor board

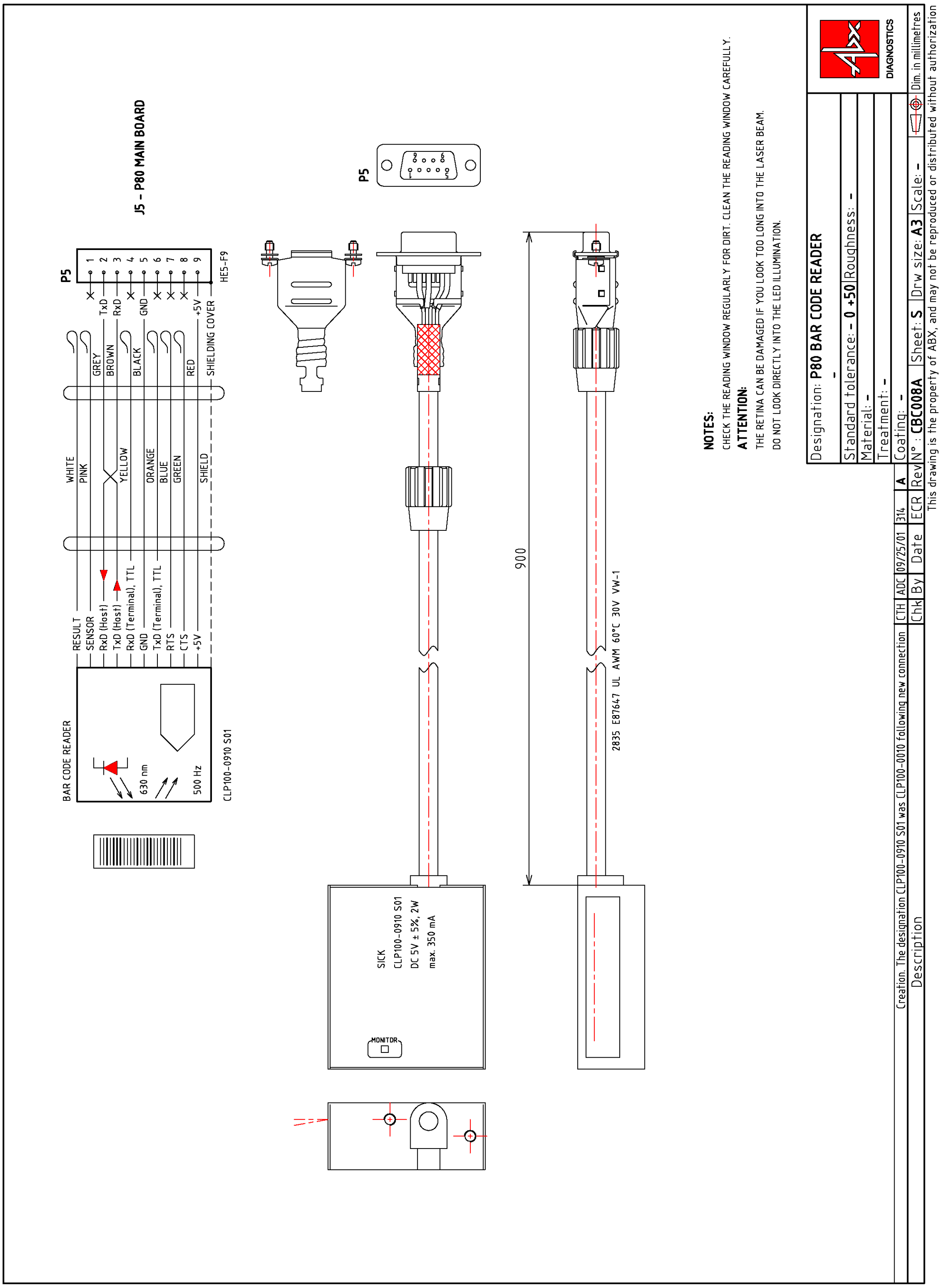
2.1. Motor board general view


MAIN BOARD
POWER SUPPLY
J1
J2
DS1
+24V
SS_3 MOTOR
IT_5 MOTOR HOME
REAGENT SYRINGES
SS_3 MOTOR
IT_6 MOTOR HOME
INJECTOR SYRINGES
SS_2 MOTOR
IT_3 MOTOR HOME
COUNTING SYRINGE (Long)
SS_2 MOTOR
IT_4 MOTOR HOME
DRAINING #2 SYRINGE (Short)
SS_1 MOTOR
IT_1 MOTOR HOME
SAMPL. HORIZ. CARRIAGE
SS_1 MOTOR
IT_2 MOTOR HOME
DRAINING #1 SYRINGE (Short)
SW_T-1 MOTOR HOME
M2 MOTOR
RACK TRANSFER
M1 RACK LOADING MOTOR
J3
J4
J5
J6
J7
J8
J9
J10
J12
J11
J13
J14
J18
J19
PIC 16: Reagent & Injector Syringes
U2
U1
Reagent syr. motor current
R16
TP1
U3
Injector syr. motor current
R23
TP2
GND
TP10
PIC 16: Counting & Draining #2 Syringes
U5
U4
Counting motor current
R38
TP3
U6
Draining #2 motor current
R50
TP4
PIC 16: Sampl. horiz. carriage & Draining #1
U7
U8
Carriage motor current
R59
TP5
U9
Draining #1 motor current
R73
TP6
J15
PIC 16: Rack Transfer
U10
U11
Transfer motor current
R92
TP7
J17
Rack Transfer & Loading SWITCHES
PIC 16: Rack Loading
U12
U13
Loading motor current
R110
TP8
PIC 16: Tube Mixer
U14
U15
Mixer motor current
TP9
R122
J20
J21
J22
J23
EA-1 Rack Transfer SOLENOID
EA-2 head locking SOLENOID
SW_M-1 MOTOR HOME
SW_M-2 GRABBER STATUS
M3 MOTOR
TUBE MIXER

Diag.2:Motor board general view

3. Connectors and other boards

3.1. CBC008A Barcode reader


BAR CODE READER
630 nm
500 Hz
CLP100-0910 S01
RESULT
SENSOR
RxD (Host)
TxD (Host)
RxD (Terminal), TTL
GND
TxD (Terminal), TTL
RTS
CTS
+5V
WHITE
PINK
GREY
BROWN
YELLOW
BLACK
ORANGE
BLUE
GREEN
RED
SHIELD
SHIELDING COVER
P5
1 2 3 4 5 6 7 8 9
TxD
RxD
GND
+5V
HE5-F9
J5 - P80 MAIN BOARD
P5
900
2835 E87647 UL AWM 60°C 30V VW-1
SICK
CLP100-0910 S01
DC 5V ± 5%, 2W
max. 350 mA
MONITOR
NOTES:
CHECK THE READING WINDOW REGULARLY FOR DIRT. CLEAN THE READING WINDOW CAREFULLY.
ATTENTION:
THE RETINA CAN BE DAMAGED IF YOU LOOK TOO LONG INTO THE LASER BEAM.
DO NOT LOOK DIRECTLY INTO THE LED ILLUMINATION.
DIAGNOSTICS
Designation: P80 BAR CODE READER
Standard tolerance: - 0 +50
Roughness: -
Material: -
Treatment: -
Coating: -
N°: CBC008A
Sheet: S
Drw size: A3
Scale: -
Dim. in millimetres
CTH ADC 09/25/01 314 A Creation. The designation CLP100-0910 S01 was CLP100-0010 following new connection
Chk By Date ECR Rev Description
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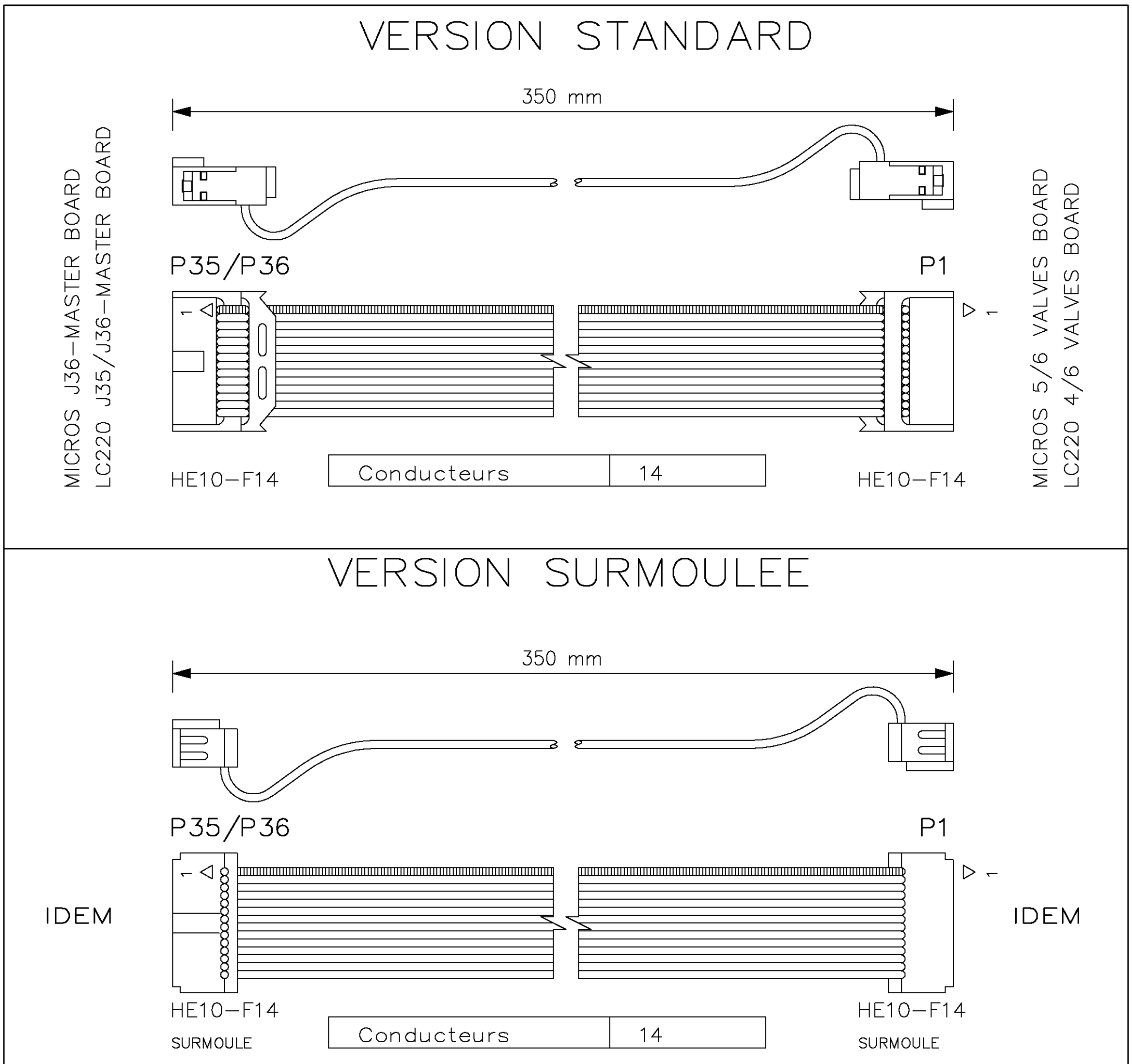
Diag.3:CBC008A Barcode reader

3.2. DAD075AS Flat cable 350mm. 14pts


VERSION STANDARD
350 mm
MICROS J36–MASTER BOARD
LC220 J35/J36–MASTER BOARD
P35/P36
P1
MICROS 5/6 VALVES BOARD
LC220 4/6 VALVES BOARD
1
1
HE10–F14
Conducteurs 14
HE10–F14
VERSION SURMOULEE
350 mm
P35/P36
P1
IDEM
IDEM
1
1
HE10–F14
SURMOULE
Conducteurs 14
HE10–F14
SURMOULE

NOTA: Se référer à la procédure de fabrication des limandes : RCF013A

C	2584	14/04/95	Rallonger la limande de 30 mm, pour une utilisation commune sur MICROS et LC220
B		11/05/94	Compatibilité entre version standard et version surmoulée.
A		03/02/94	Création.
In.	DM	Date	Modification

Désignation:LIMANDE 5/6 ELECTROVANN MICROS
4/6 ELECTROVANNES LC220

DAD075A
Ind Modif:C

REF du document:DAD075AS

Nbr:

HEMATOLOGIE

Plan dessiné le: 01/ 01/94 Par:A. DA COSTA

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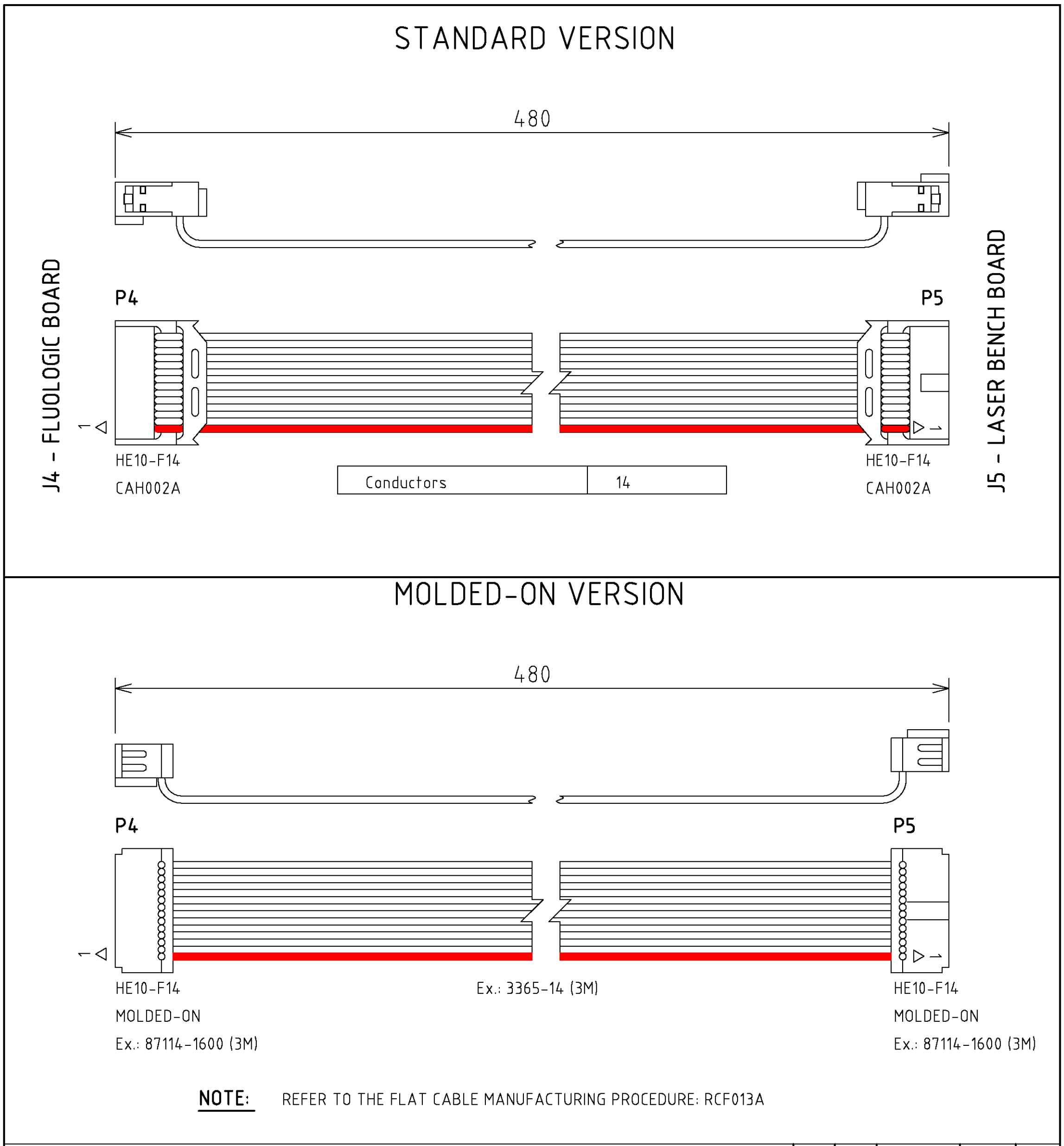
Diag.4:DAD075AS Flat cable 350mm. 14pts

3.3. DAD075AS Flat cable 480mm. 14pts


STANDARD VERSION
480
J4 - FLUOLOGIC BOARD
J5 - LASER BENCH BOARD
P4
P5
1
1
HE10-F14
CAH002A
HE10-F14
CAH002A
Conductors
14
MOLDED-ON VERSION
480
P4
P5
1
1
HE10-F14
MOLDED-ON
Ex.: 87114-1600 (3M)
Ex.: 3365-14 (3M)
HE10-F14
MOLDED-ON
Ex.: 87114-1600 (3M)

NOTE: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A

Description	Chk	By	Date	ECR	Rev
Add molded-on version	GC	ADC	05/16/02	681	B
Creation for RETIC optical bench	GC	ADC	01/31/97	3466	A

Designation: **FLAT CABLE 14 POINTS / L = 480**
–
Standard tolerance: – Roughness: –
Material: –
Treatment: –
Coating: –
N° : **DAD107A** Sheet: **S** Drw size: **A4** Scale: – Dim. in millimetres

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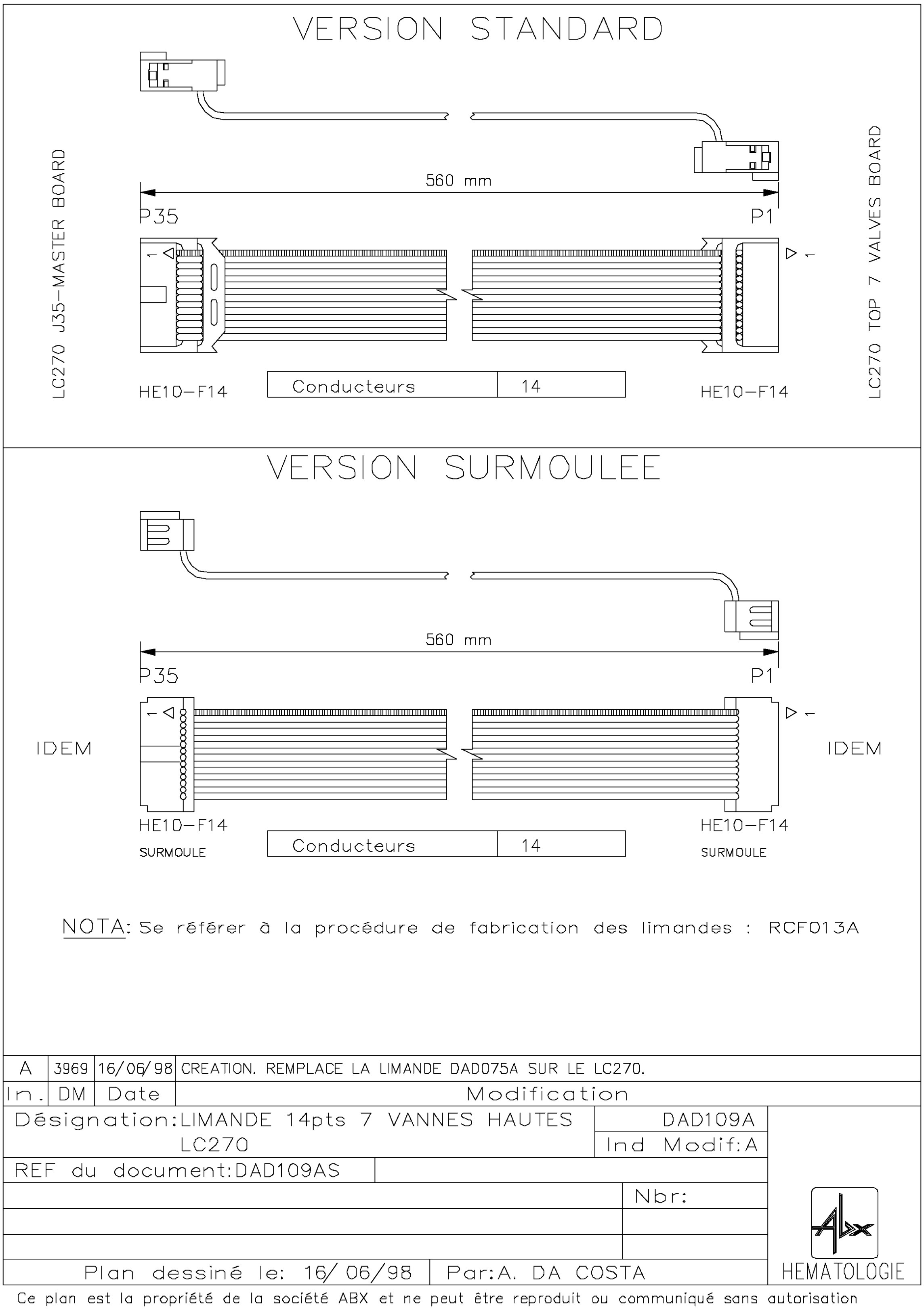
Diag.5:DAD075AS Flat cable 480mm. 14pts

3.4. DAD109A Flat cable 560mm. 14pts


VERSION STANDARD
560 mm
P35
P1
LC270 J35-MASTER BOARD
LC270 TOP 7 VALVES BOARD
1
1
HE10-F14
Conducteurs 14
HE10-F14
VERSION SURMOULEE
560 mm
P35
P1
IDEM
IDEM
HE10-F14
SURMOULE
Conducteurs 14
HE10-F14
SURMOULE
NOTA: Se référer à la procédure de fabrication des limandes : RCF013A
A 3969 16/06/98 CREATION. REMPLACE LA LIMANDE DAD075A SUR LE LC270.
In. DM Date Modification
Désignation:LIMANDE 14pts 7 VANNES HAUTES LC270
DAD109A
Ind Modif:A
REF du document:DAD109AS
Nbr:
Plan dessiné le: 16/06/98
Par:A. DA COSTA
HEMATOLOGIE
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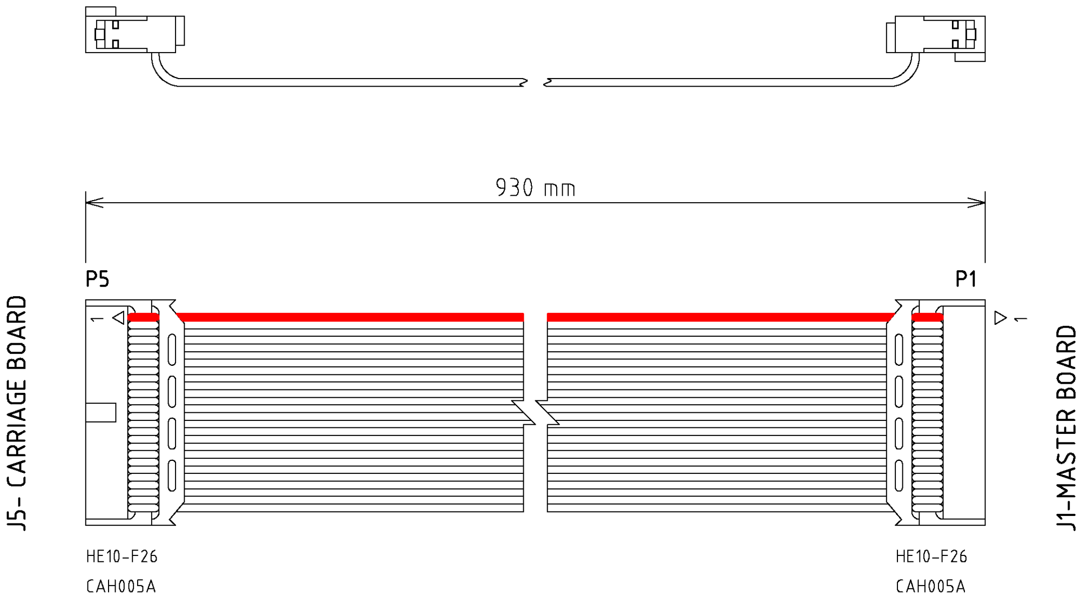
Diag.6:DAD109A Flat cable 560mm. 14pts

3.5. DAD112AS Flat cable 930mm. 26pts (Main board\Carriage board)



Conductors	26

NOTE: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A
USE THE FLEXIBLE FLAT CABLE TYPE: 3M: 3319-26
THE MARKING CAN BE REALISED ON THE CONNECTORS.

Description	Chk	By	Date	ECR	Rev
Reduce the length (960 become 930 mm) for P80-P60 common use.	CTH	ADC	03/28/01	042	C
Add note for marking instruction.	CTH	ADC	11/23/98	4203	B
Creation for PENTRA.	CTH	ADC	10/14/98	-	A

Designation: FLAT CABLE 26 POINTS / L = 930
PENTRA MASTER BOARD/CARRIAGE BOARD
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : DAD112A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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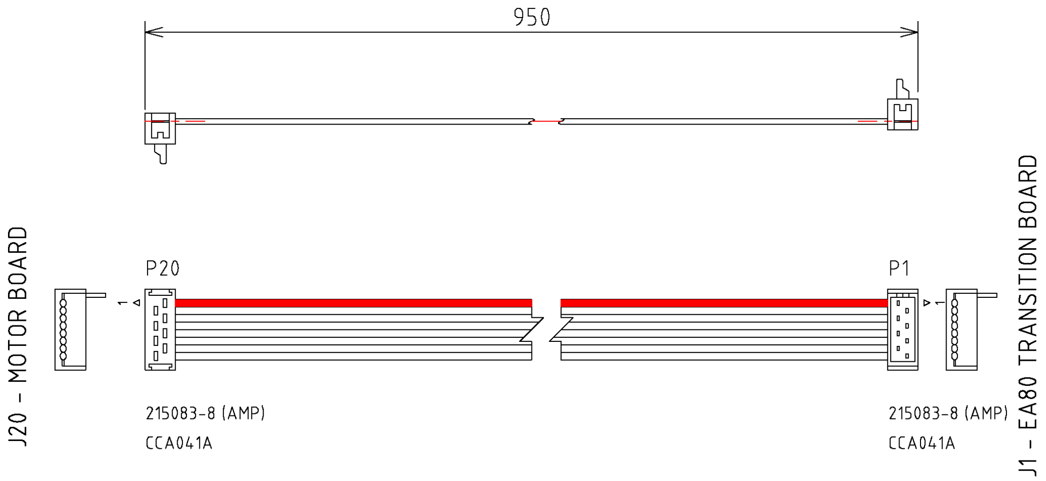
Diag.7:DAD112AS Flat cable 930mm. 26pts

3.6. DAD119AS Flat cable 950mm. 8pts


950
J20 - MOTOR BOARD
P20
1
215083-8 (AMP)
CCA041A
P1
1
215083-8 (AMP)
CCA041A
J1 - EA80 TRANSITION BOARD

Conductors	8

NOTA: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A
USE THE FLEXIBLE FLAT CABLE TYPE: 3M: 3539-10 (OR 3319-10)

Description	Chk	By	Date	ECO	Rev
Creation for PENTRA-80	CTH	ADC	04/07/00	5304	A

Designation: FLAT CABLE 8 POINTS / L = 950
K7 TRANSLATION EA1 PENTRA-80
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : DAD119A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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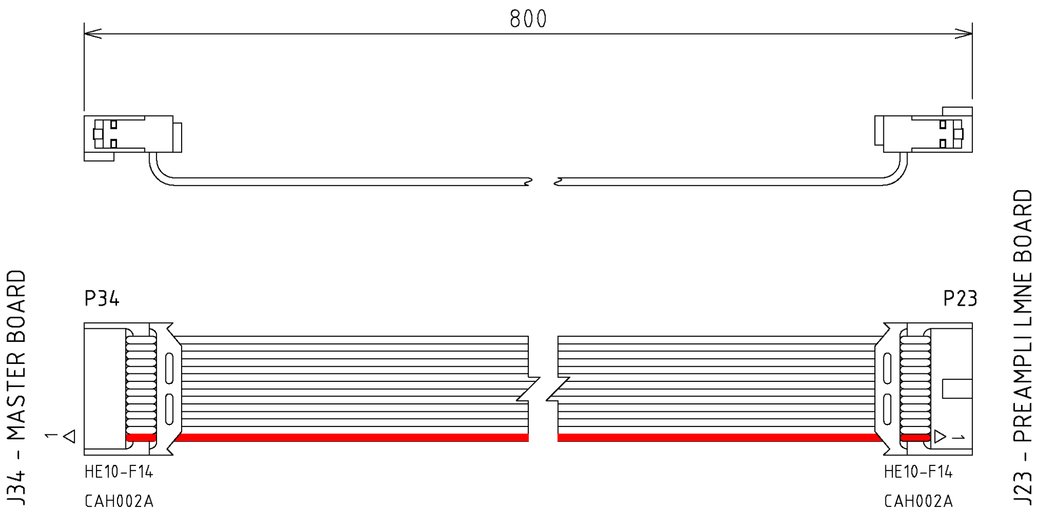
Diag.8:DAD119AS Flat cable 950mm. 8pts

3.7. DAD120A Flat cable 800mm. 14pts


800
P34
P23
J34 - MASTER BOARD
J23 - PREAMPLI LMNE BOARD
1
1
HE10-F14
CAH002A
HE10-F14
CAH002A

Conductors	14

NOTA: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A

Creation for PENTRA-80	CTH	ADC	30/06/00	5304	A
Description	Chk	By	Date	ECO	Rev

Designation: FLAT CABLE 14 POINTS / L = 800
PREAMPLI LMNE PENTRA-80
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : DAD120A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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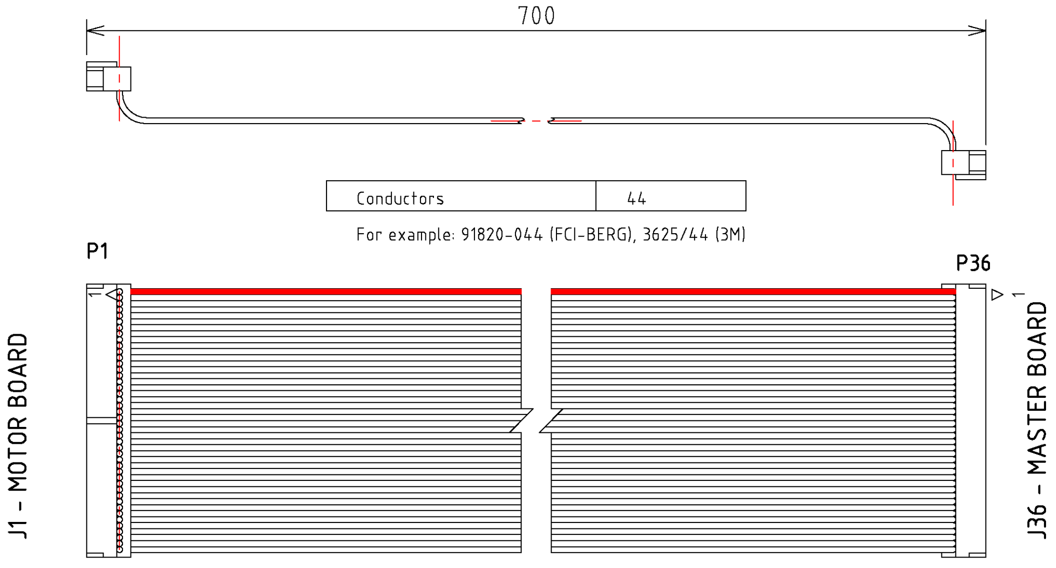
Diag.9:DAD120A Flat cable 800mm. 14pts

3.8. DAD121A Flat cable 700mm. 44pts



Conductors	44

For example: 91820-044 (FCI-BERG), 3625/44 (3M)

89947-344 (FCI-BERG)
CAH015A

89947-344 (FCI-BERG)
CAH015A

OTHER CONNECTOR SOURCES: IDS044W200-01 (E-tec), 152244-0x10GB or 87044-1600 in molded socket (3M)

NOTE: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A

Description	Chk	By	Date	ECR	Rev
Creation following prototype P80.	GC	ADC	05/02/02	747	A

Designation: **1 mm FLAT CABLE 44 points / L = 700**
PENTRA 80
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : **DAD121A** Sheet: **S** Drw size: **A4** Scale: - Dim. in millimetres

DIAGNOSTICS

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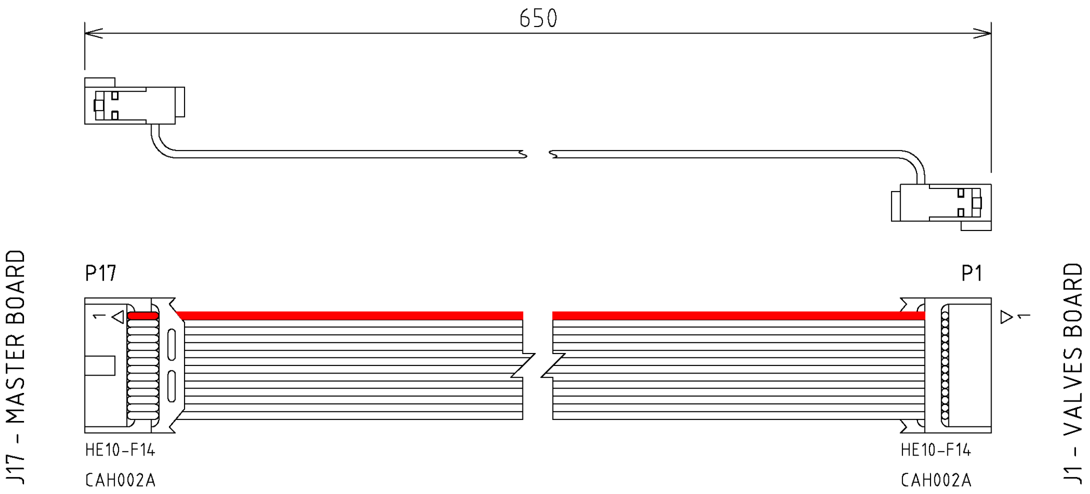
Diag.10:DAD121A Flat cable 700mm. 44pts

3.9. DAD122A Flat cable 650mm. 14pts


650
P17
P1
1
1
J17 - MASTER BOARD
J1 - VALVES BOARD
HE10-F14
CAH002A
HE10-F14
CAH002A

Conductors	14

NOTA: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A

Description	Chk	By	Date	ECO	Rev
Creation for PENTRA-80	CTH	ADC	11/06/00	5304	A

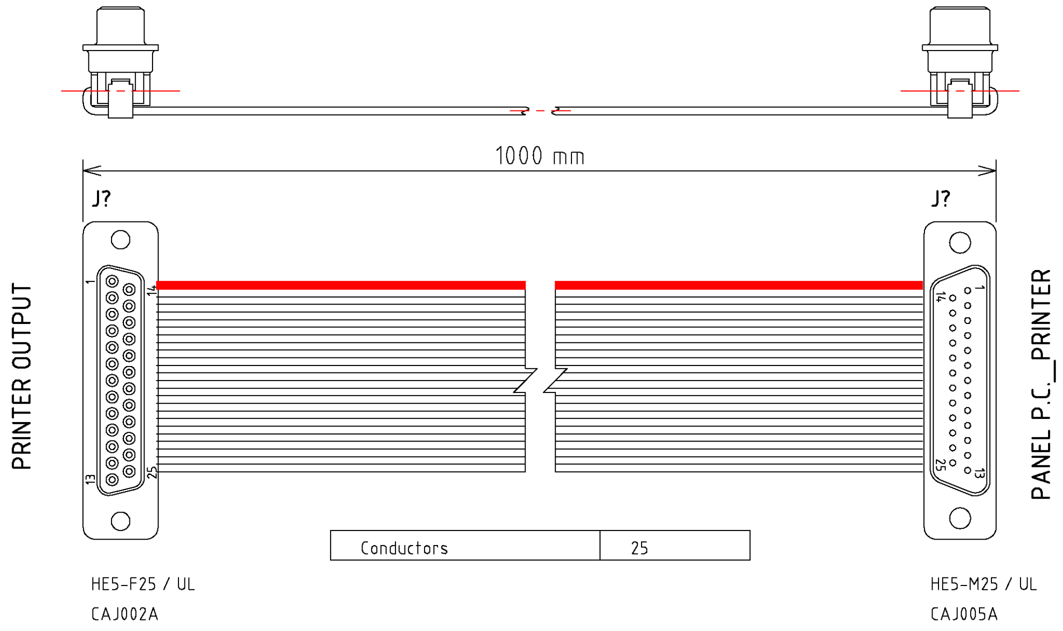
Designation: FLAT CABLE 14 POINTS / L = 650
VALVE BOARD PENTRA-80
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : DAD122A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

ABX DIAGNOSTICS

This drawing is the property of ABX, and may not be reproduced or distributed without authorization

Diag.11:DAD122A Flat cable 650mm. 14pts

3.10. DAD123A DSUB 25pts Flat cable 1000mm.


1000 mm
J?
J?
PRINTER OUTPUT
PANEL P.C.__PRINTER
1
13
14
25
Conductors
25
HE5-F25 / UL
CAJ002A
HE5-M25 / UL
CAJ005A

NOTA: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A
THE CONNECTOR HE5 MUST BE UL RECOGNISED (RTRT2 OR ECBT2): EX. ITT CANNON, 3M, FCI.

Creation for PENTRA-80	Cth	ADC	11/08/00	5304	A
Description	Chk	By	Date	ECO	Rev

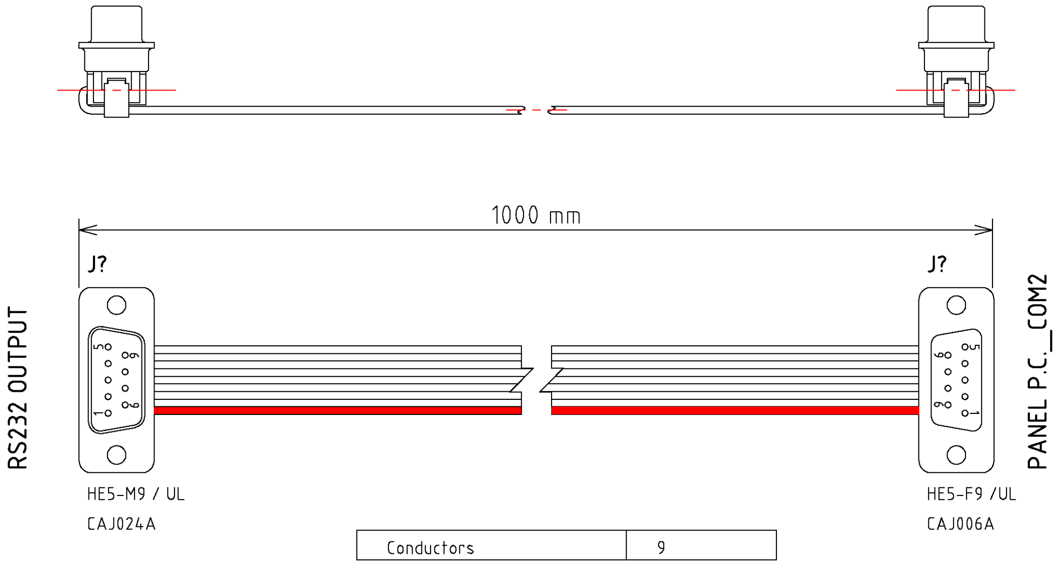
Designation: DSUB 25 POINTS FLAT CABLE / L = 1000
PENTRA 80 PC - PRINTER / PRINTER OUTPUT
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : DAD123A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

This drawing is the property of ABX, and may not be reproduced or distributed without authorization

Diag.12:DAD123A DSUB 25pts Flat cable 1000mm.

3.11. DAD124A DSUB 9pts Flat cable 1000mm.


1000 mm
J?
J?
RS232 OUTPUT
PANEL P.C._COM2
5
9
6
1
HE5-M9 / UL
CAJ024A
HE5-F9 /UL
CAJ006A
Conductors
9

NOTA: REFER TO THE FLAT CABLE MANUFACTURING PROCEDURE: RCF013A
THE CONNECTOR HE5 MUST BE UL RECOGNISED (RTRT2 OR ECBT2): EX. ITT CANNON, 3M, FCI.

Description	Chk	By	Date	ECO	Rev
Creation for PENTRA-80	Cth	ADC	11/09/00	5304	A

Designation: DSUB 9 POINTS FLAT CABLE / L = 1000
PENTRA 80 PC COM2 / RS232 OUTPUT
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : DAD124A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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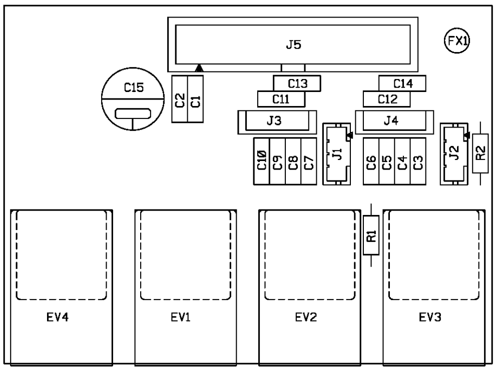
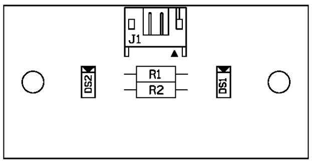
Diag.13:DAD124A DSUB 9pts Flat cable 1000mm.

3.12. XAA428C Carriage board


J5
FX1
C15
C2
C1
C13
C11
C14
C12
J3
J4
J1
J2
R2
C10
C9
C8
C7
C6
C5
C4
C3
R1
EV4
EV1
EV2
EV3

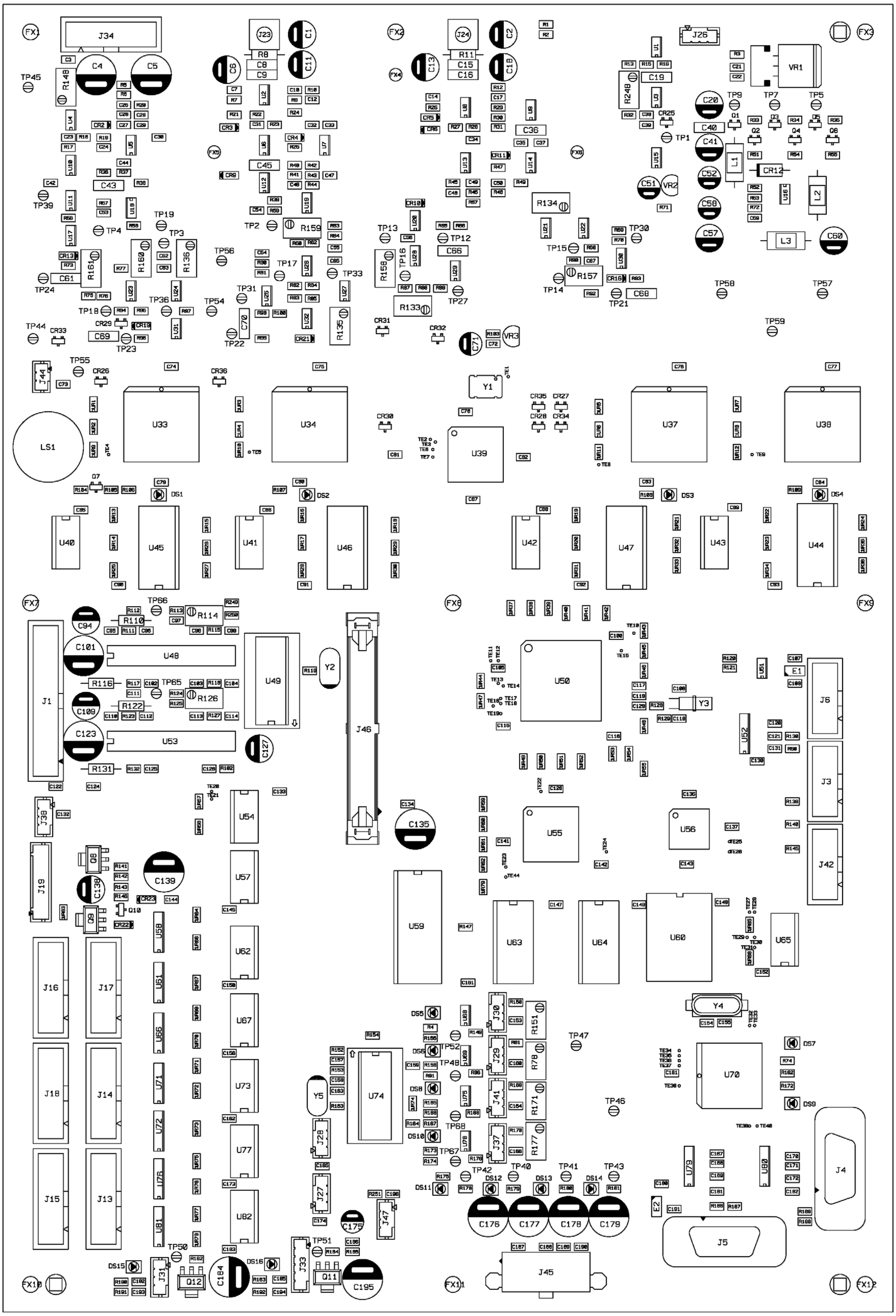
Diag.14:XAA428C Carriage board

3.13. XAA429A LEDs board


J1
R1
R2
DS2
DS1

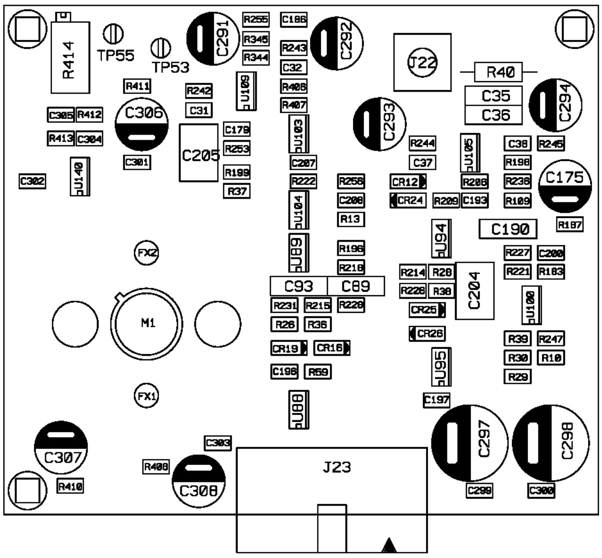
Diag.15:XAA429A LEDs board

3.14. XAA456A Main board


FX1
J34
C4
C5
J23
C1
FX2
J24
C2
J26
VR1
FX3
TP45
R148
C6
R8
C8
C9
C11
C13
R11
C15
C16
C18
C19
R240
C20
TP9
TP7
TP5
C40
C41
TP1
C36
C45
C43
TP39
TP19
TP4
TP3
TP2
R159
TP13
TP12
C66
R134
C51
VR2
C52
L1
CR12
C50
L2
TP30
C57
L3
C60
TP56
TP17
TP33
TP16
R158
TP15
R157
TP14
C68
TP21
TP58
TP57
C61
R161
R160
R136
TP24
TP18
TP36
TP54
TP31
C70
R135
R133
TP27
TP44
C69
TP23
TP22
C71
VR3
TP59
TP55
J44
Y1
U33
U34
U37
U38
LS1
U39
DS1
DS2
DS3
DS4
U40
U45
U41
U46
U42
U47
U43
U44
FX7
TP66
R114
FX6
FX9
C94
R110
C101
U48
U49
Y2
J46
U50
R116
TP65
R126
E1
J6
J1
R122
C106
Y3
C123
U53
C127
U52
J3
R131
J38
U54
C135
U55
U56
J42
J19
Q8
C139
C138
U57
Q9
Q10
U59
U63
U64
U60
U65
J16
J17
U58
U62
U61
Y4
U67
U68
DS5
J30
R151
TP47
U66
DS6
TP52
J29
R78
DS7
U70
J18
J14
U71
U73
Y5
U74
DS8
TP48
U75
J41
R171
TP46
DS9
U72
U77
J28
TP68
TP67
U78
J37
R177
J15
J13
U76
U79
U80
J4
TP42
TP40
TP41
TP43
DS12
DS13
DS14
DS11
J27
C175
J47
C176
C177
C178
C179
E2
U81
U82
TP51
TP50
J33
J5
DS15
DS16
FX10
J31
Q12
C184
Q11
C195
FX11
J45
FX12

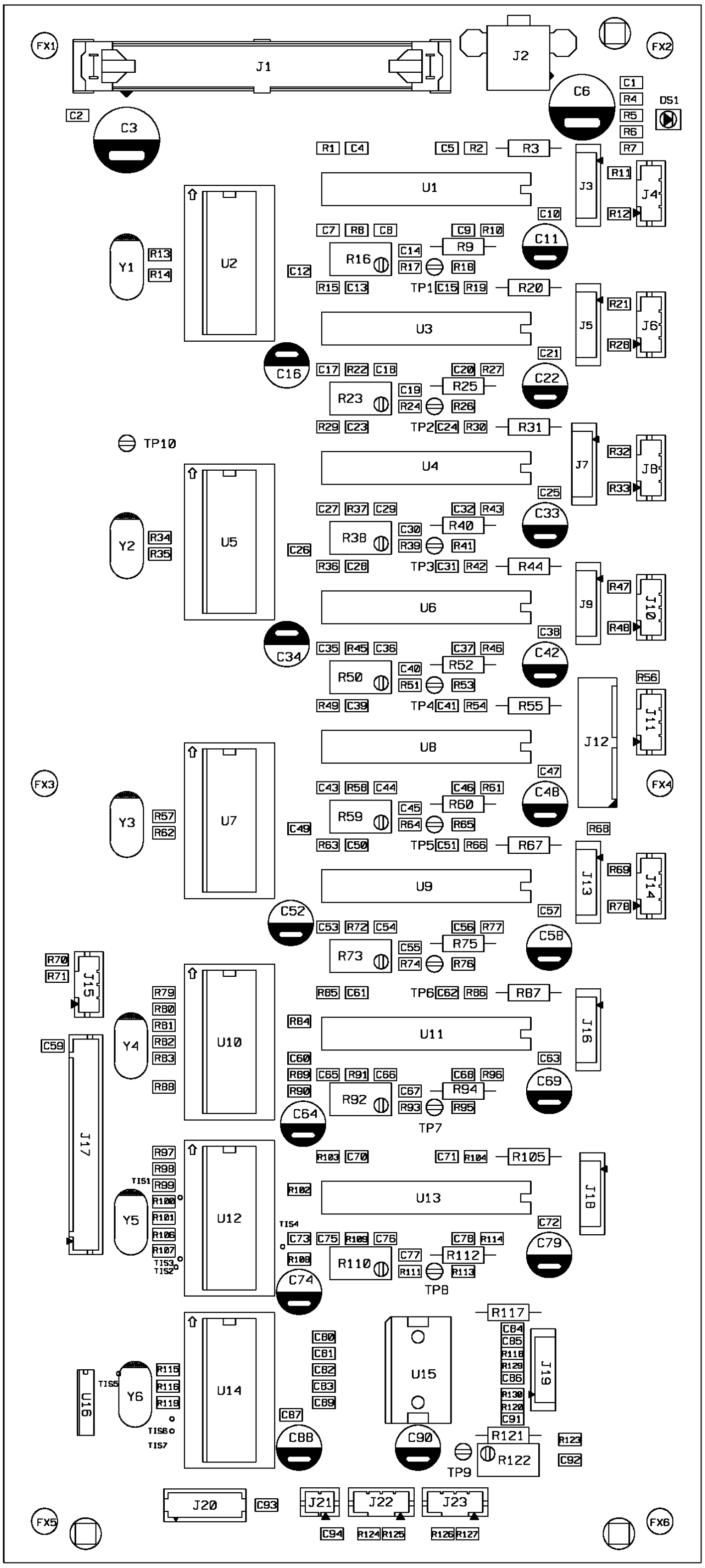
Diag.16:XAA456A Main board

3.15. XAA458A LMNE amplifier board


R414
TP55
TP53
C291
R255
R345
R344
C186
R243
C32
R406
R407
C292
J22
R40
C35
C36
C294
R411
R242
C31
U109
C305
R412
R413
C304
C306
C301
C205
C179
R253
R199
R37
U103
C207
R222
C293
R244
C37
U105
C38
R245
R198
R236
R109
C175
C302
U140
R256
C208
R13
CR12
CR24
R209
R206
C193
R187
C190
U104
U89
R196
R218
U94
R227
C200
R221
R183
FX2
C93
C89
R214
R28
R226
R38
C204
U100
M1
R231
R215
R220
R26
R36
CR25
CR26
CR19
CR16
R39
R247
R30
R10
R29
C198
R59
U95
FX1
C197
U88
C303
C307
R408
C308
R410
J23
C297
C298
C299
C300

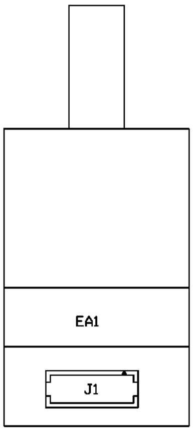
Diag.17:XAA458A LMNE amplifier board

3.16. XAA459A Motor board


FX1
J1
J2
FX2
C6
C1
R4
R5
R6
DS1
C2
C3
R1
C4
C5
R2
R3
R7
U1
J3
R11
J4
R12
C10
U2
Y1
R13
R14
C7
R8
C8
C9
R10
C11
R16
C14
R9
R17
R18
C12
R15
C13
TP1
C15
R19
R20
J5
R21
J6
R28
U3
C16
C17
R22
C18
C20
R27
C21
C22
R23
C19
R25
R24
R26
R29
C23
TP2
C24
R30
R31
TP10
J7
R32
J8
R33
U4
Y2
U5
R34
R35
C25
C27
R37
C29
C32
R43
C33
R38
C30
R40
R39
R41
C26
R36
C28
TP3
C31
R42
R44
J9
R47
J10
R48
U6
C34
C38
C35
R45
C36
C37
R46
C42
R50
C40
R52
R51
R53
R56
R49
C39
TP4
C41
R54
R55
J11
J12
U8
FX3
C47
FX4
C43
R58
C44
C46
R61
C48
Y3
U7
R57
R62
R59
C45
R60
R64
R65
C49
R68
R63
C50
TP5
C51
R66
R67
J13
R69
J14
R78
U9
C52
C57
C53
R72
C54
C56
R77
C58
R75
R73
C55
R74
R76
R70
R71
J15
R79
R80
R81
R82
R83
R85
C61
TP6
C62
R86
R87
J16
Y4
U10
R84
U11
C59
C60
C63
R89
C65
R91
C66
C68
R96
C69
R90
R92
C67
R94
R93
R95
C64
TP7
R88
J17
R97
R98
R103
C70
C71
R104
R105
TIS1
R99
R100
U12
R102
U13
J18
Y5
R101
R106
TIS4
C72
R107
C73
C75
R109
C76
C78
R114
C79
TIS3
TIS2
R108
R110
C77
R112
R111
R113
TP8
C74
R117
U14
C80
C84
C85
R118
R119
C81
C86
J19
U16
TIS5
Y6
R115
R116
R118
C82
U15
C83
R130
R120
C89
C91
TIS6
TIS7
C87
C88
C90
R121
R123
TP9
R122
C92
J20
C93
J21
J22
J23
FX5
FX6
C94
R124
R125
R126
R127

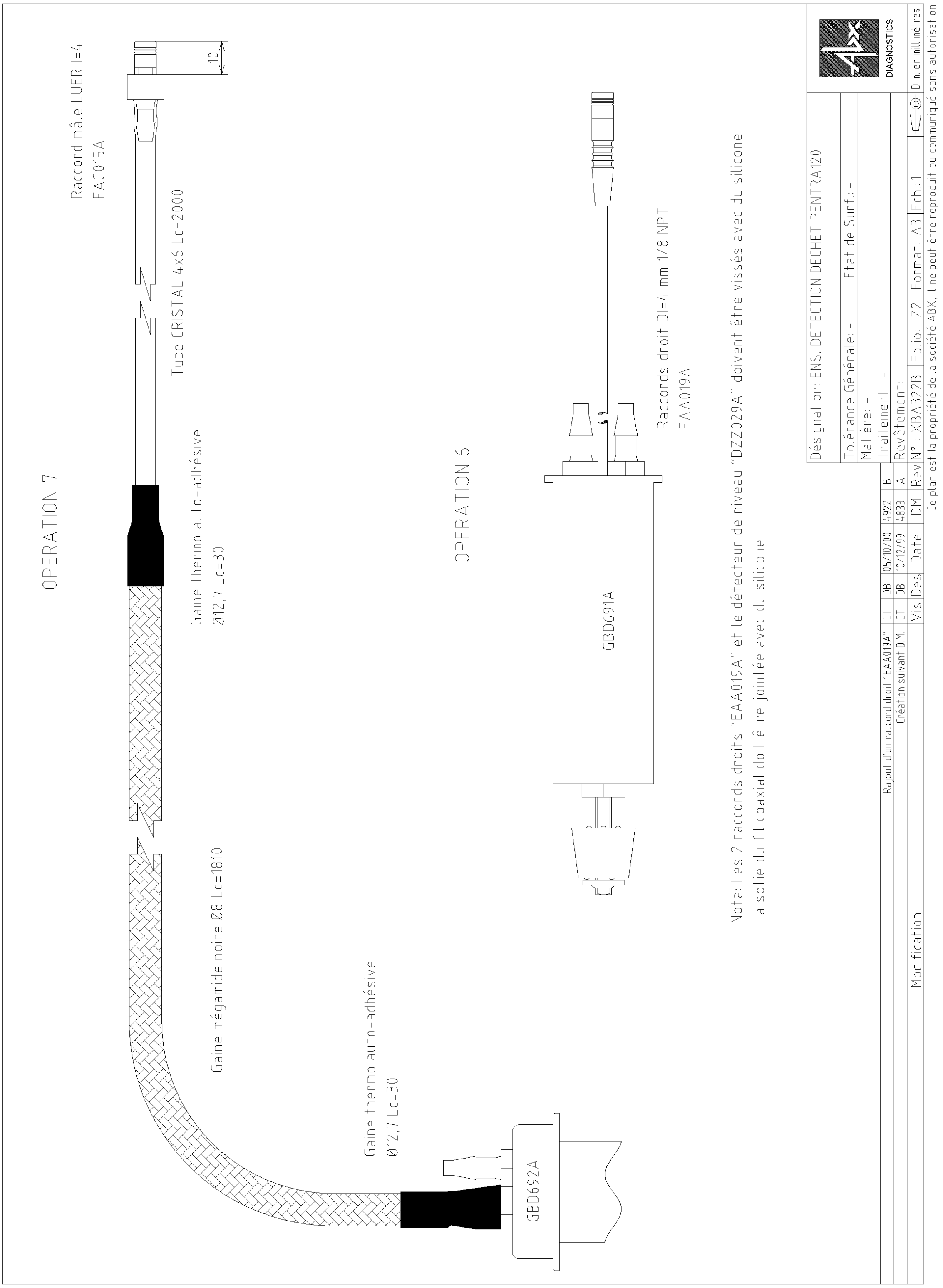
Diag.18:XAA459A Motor board

3.17. XAA478A Solenoid board



Diag.19:XAA478A Solenoid board

3.18. XBA322B External waste level detection


Raccord mâle LUER l=4
EAC015A
10
Tube CRISTAL 4x6 Lc=2000
OPERATION 7
Gaine thermo auto-adhésive
Ø12,7 Lc=30
Gaine mégamide noire Ø8 Lc=1810
Gaine thermo auto-adhésive
Ø12,7 Lc=30
GBD692A
OPERATION 6
GBD691A
Raccords droit DI=4 mm 1/8 NPT
EAA019A
Nota: Les 2 raccords droits "EAA019A" et le détecteur de niveau "DZZ029A" doivent être vissés avec du silicone
La sotie du fil coaxial doit être jointée avec du silicone
DIAGNOSTICS
Désignation: ENS. DETECTION DECHET PENTRA120
-
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement: -
N° : XBA322B
Folio: Z2
Format: A3
Ech.:1
Dim. en millimètres
Rajout d'un raccord droit "EAA019A" CT DB 05/10/00 4922 B
Création suivant D.M. CT DB 10/12/99 4833 A
Modification Vis Des Date DM Rev
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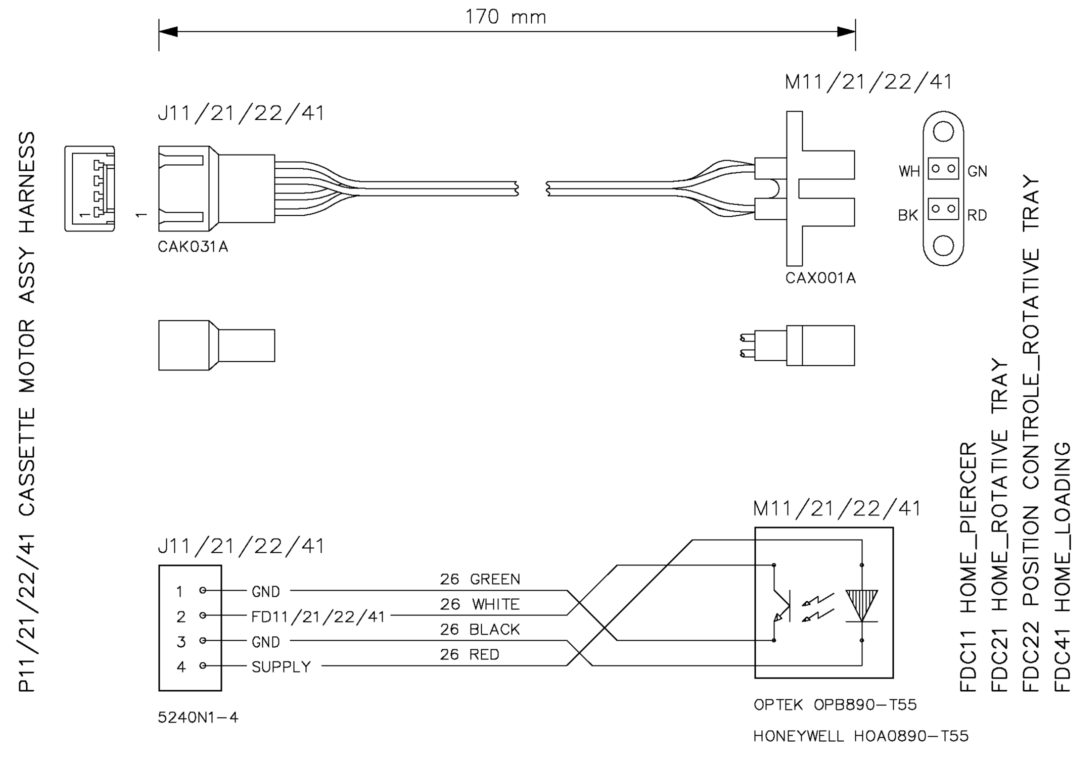
Diag.20:XBA322B External waste level detection

3.19. XBA342A Infrared sensor


170 mm
J11/21/22/41
M11/21/22/41
P11/21/22/41 CASSETTE MOTOR ASSY HARNESS
1
1
CAK031A
CAX001A
WH
GN
BK
RD
FDC11 HOME_PIERCER
FDC21 HOME_ROTATIVE TRAY
FDC22 POSITION CONTROLE_ROTATIVE TRAY
FDC41 HOME_LOADING
J11/21/22/41
M11/21/22/41
1 GND
2 FD11/21/22/41
3 GND
4 SUPPLY
26 GREEN
26 WHITE
26 BLACK
26 RED
5240N1-4
OPTEK OPB890-T55
HONEYWELL HOA0890-T55

In.	DM	Date	Modification
B	3745	03/03/98	SECONDE SOURCE CELLULE IR: HONEYWELL HOA0890-T55.
A	3130	19/02/96	Création.

Désignation:CELLULES IR 2 PATTES CABLEES 170mm MOTEURS CASSETTES VEGA

XBA342AS

Ind Modif:B

REF du document:XBA342ASS

Nbr:

Plan dessiné le: 19/02/96 Par:A. DA COSTA

ABX HEMATOLOGIE

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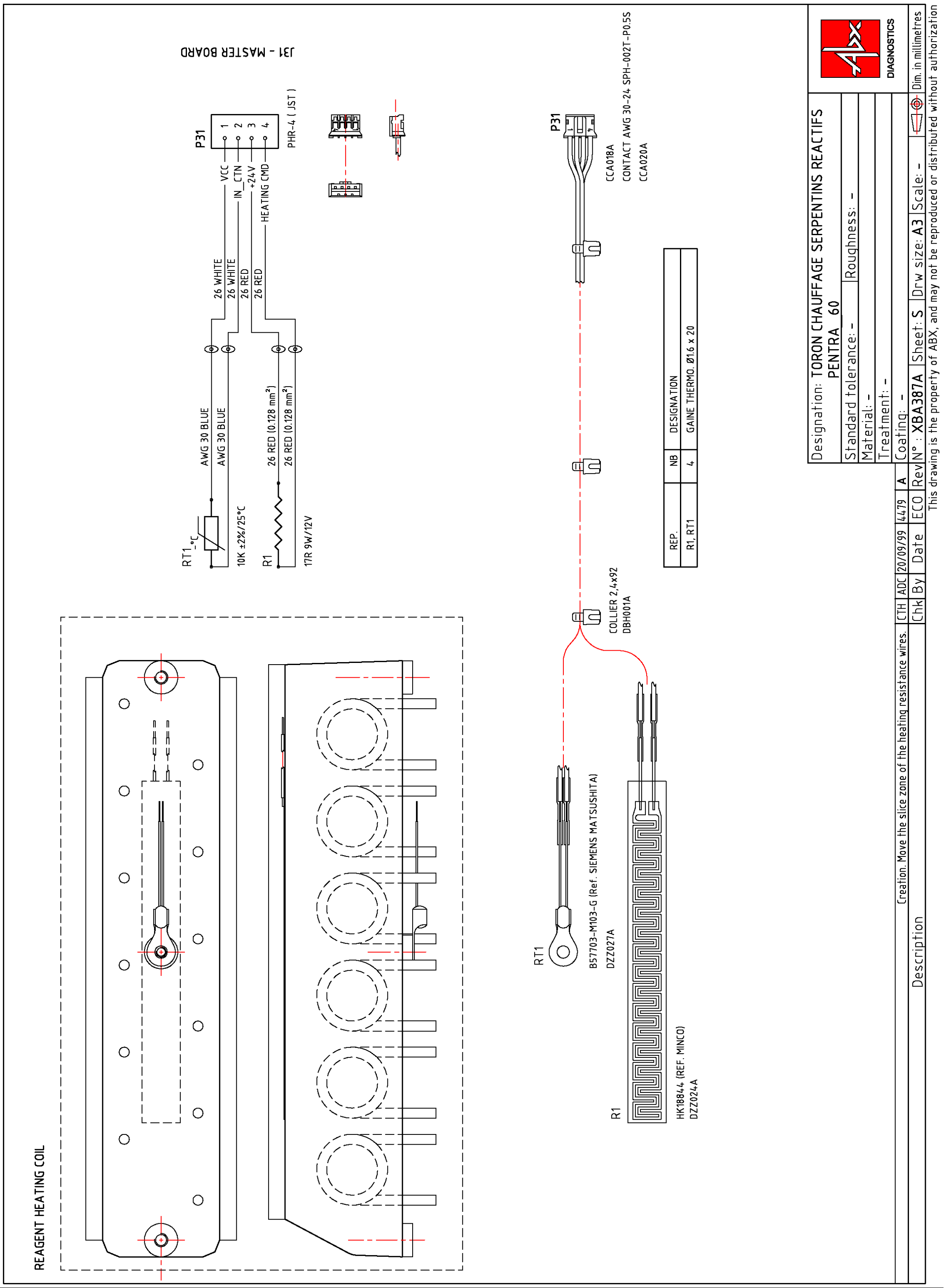
Diag.21:XBA342A Infrared sensor

3.20. XBA387A Reagent heating coil


J31 - MASTER BOARD
P31
1
2
3
4
PHR-4 (JST)
VCC
IN_CTN
+24V
HEATING CMD
26 WHITE
26 WHITE
26 RED
26 RED
AWG 30 BLUE
AWG 30 BLUE
26 RED (0.128 mm²)
26 RED (0.128 mm²)
RT1
°C
10K ±2%/25°C
R1
17R 9W/12V
P31
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
COLLIER 2,4x92
DBH001A
RT1
B57703-M103-G (Ref. SIEMENS MATSUSHITA)
DZZ027A
R1
HK18844 (REF. MINCO)
DZZ024A
REAGENT HEATING COIL
Designation: TORON CHAUFFAGE SERPENTINS REACTIFS
PENTRA 60
Standard tolerance: -
Roughness: -
Material: -
Treatment: -
Coating: -
DIAGNOSTICS
Dim. in millimetres
N° : XBA387A
Sheet: S
Drw size: A3
Scale: -
Rev
ECO
Date
By
Chk
Description
A
4479
20/09/99
ADC
CTH
Creation. Move the slice zone of the heating resistance wires.
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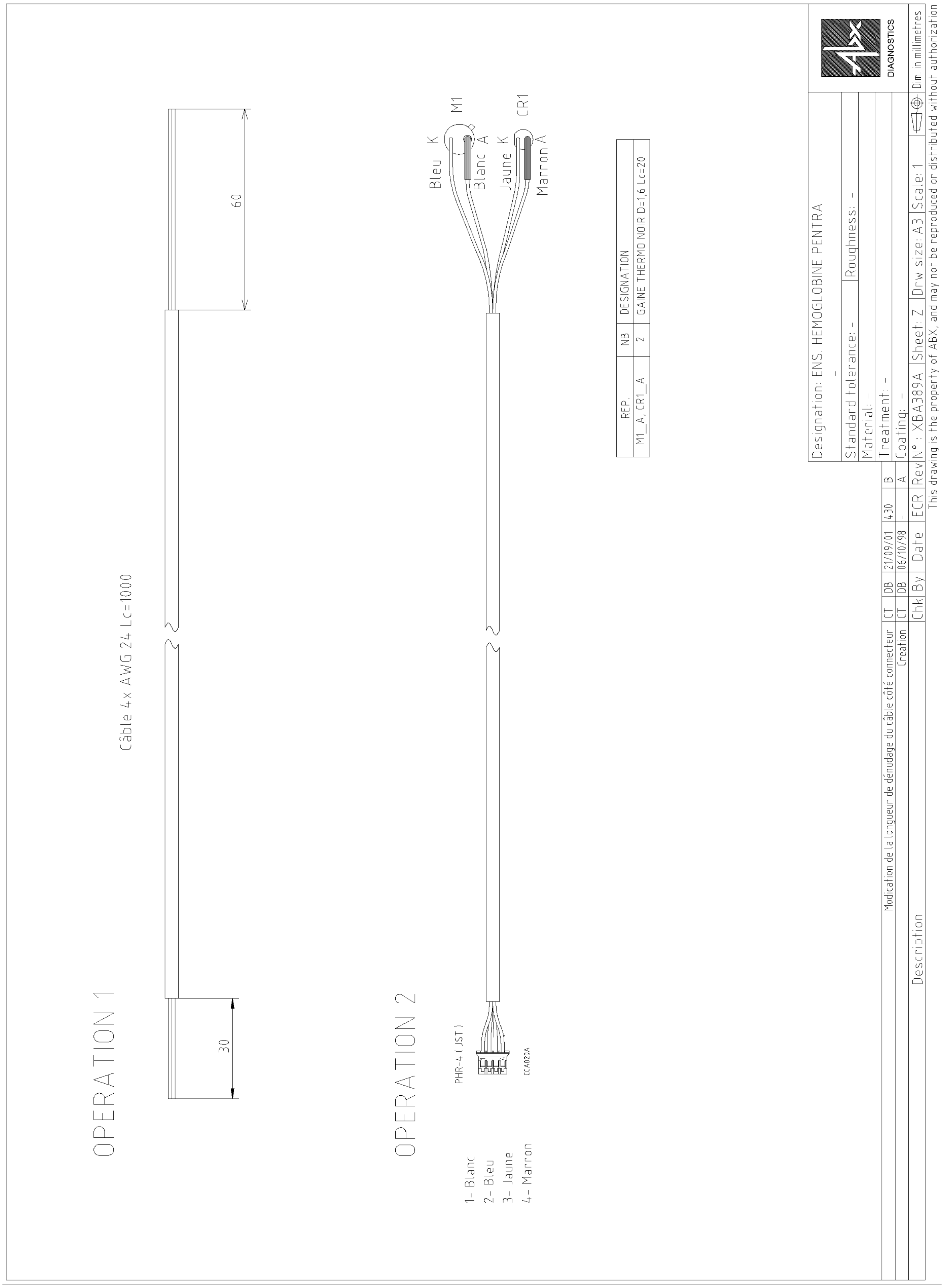
REP.	NB	DESIGNATION
R1, RT1	4	GAINE THERMO. Ø1.6 x 20

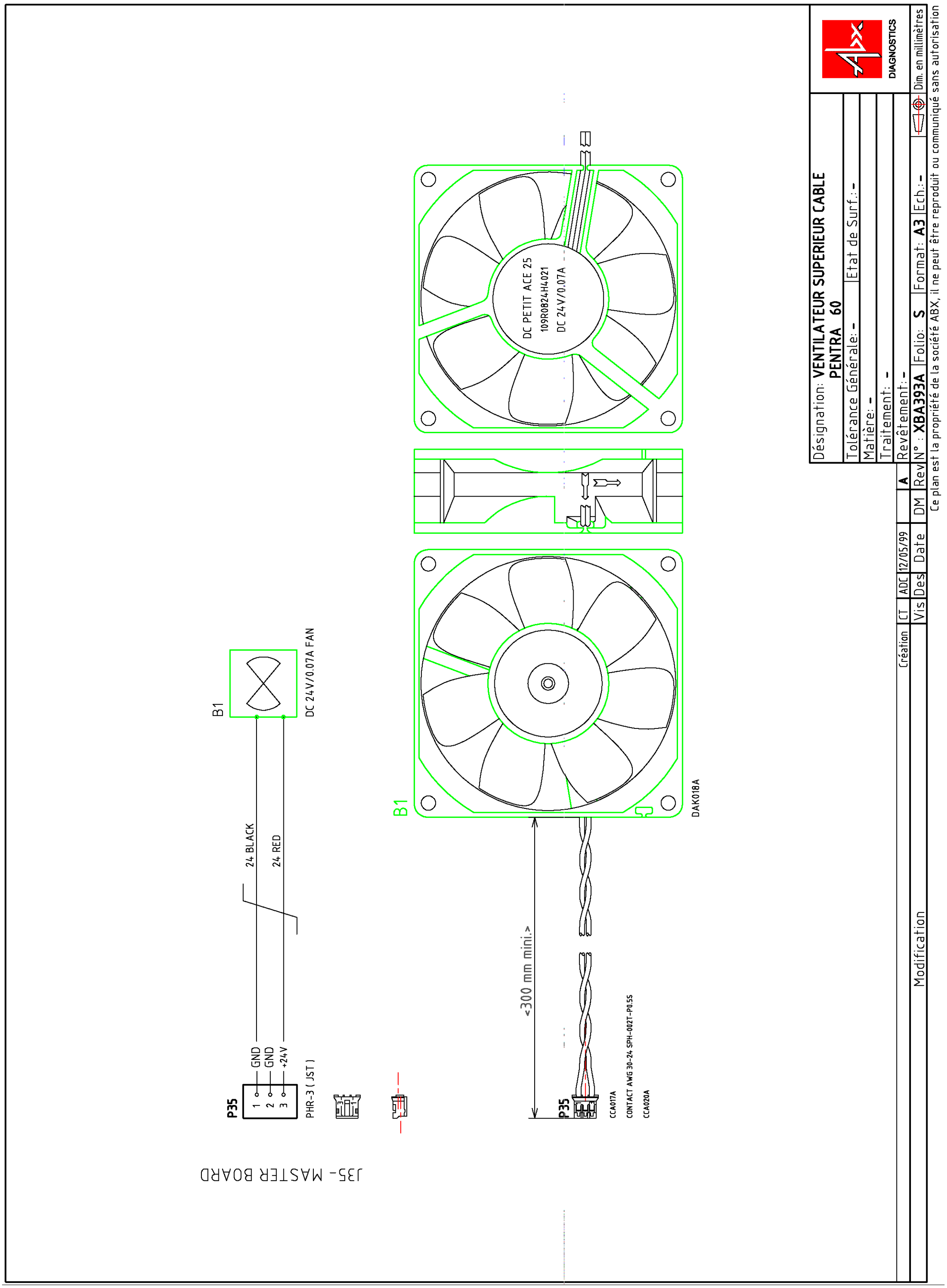
Diag.22:XBA387A Reagent heating coil

3.21. XBA389A Hemoglobin photometer


OPERATION 1
Câble 4x AWG 24 Lc=1000
60
30
OPERATION 2
PHR-4 (JST)
CCA020A
1- Blanc
2- Bleu
3- Jaune
4- Marron
Bleu K
Blanc A
M1
Jaune K
Marron A
CR1
REP. | NB | DESIGNATION
M1_A, CR1_A | 2 | GAINE THERMO NOIR D=1,6 Lc=20
DIAGNOSTICS
Designation: ENS. HEMOGLOBINE PENTRA
Standard tolerance: -
Roughness: -
Material: -
Treatment: -
Coating: -
N°: XBA389A
Sheet: Z
Drw size: A3
Scale: 1
Dim. in millimetres
This drawing is the property of ABX, and may not be reproduced or distributed without authorization
Modication de la longueur de dénudage du câble côté connecteur | CT | DB | 21/09/01 | 430 | B
Creation | CT | DB | 06/10/98 | - | A
Description | Chk | By | Date | ECR | Rev

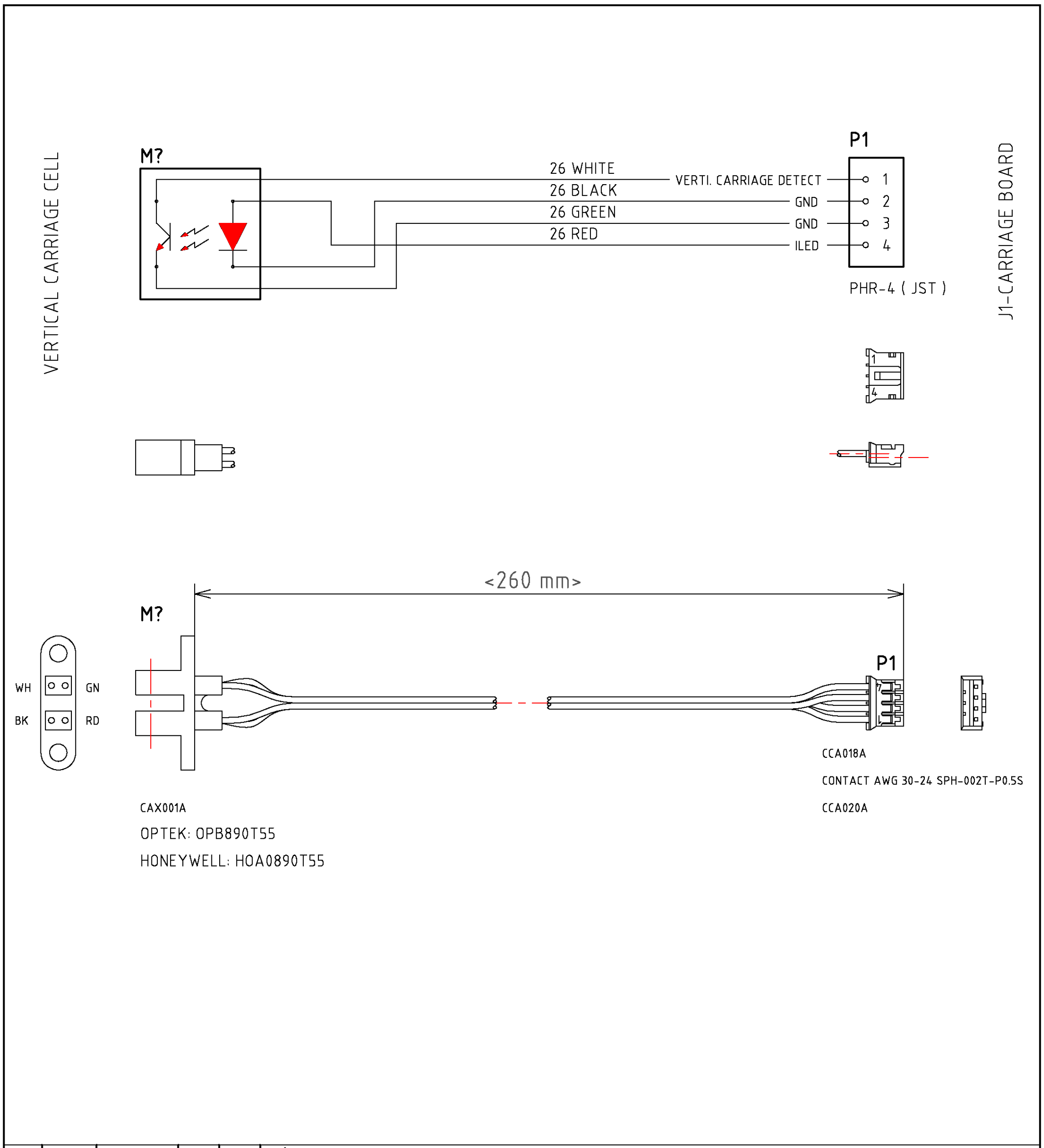
Diag.23:XBA389A Hemoglobin photometer

3.22. XBA393A Upper fan


Désignation: VENTILATEUR SUPERIEUR CABLE
PENTRA 60
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement: -
N° : XBA393A
Folio: S
Format: A3
Ech.: -
Dim. en millimètres
DIAGNOSTICS
Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation
Création
CT
ADC
12/05/99
A
Vis
Des
Date
DM
Rev
Modification
DC PETIT ACE 25
109R0824H4021
DC 24V/0.07A
B1
DAK018A
<300 mm mini.>
P35
CCA017A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
B1
DC 24V/0.07A FAN
24 BLACK
24 RED
P35
1 GND
2 GND
3 +24V
PHR-3 (JST)
J35- MASTER BOARD

Diag.24:XBA393A Upper fan

3.23. XBA396A Infrared 260mm.


VERTICAL CARRIAGE CELL
M?
26 WHITE
26 BLACK
26 GREEN
26 RED
VERTI. CARRIAGE DETECT
GND
GND
ILED
P1
1
2
3
4
PHR-4 (JST)
J1-CARRIAGE BOARD
<260 mm>
M?
P1
WH
GN
BK
RD
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
CAX001A
OPTEK: OPB890T55
HONEYWELL: HOA0890T55

A	-	12/10/98	ADC	CT	Création pour PENTRA.
Ind	DM	Date	Des	Vis	Modification

Désignation: **CELLULE IR 2 PATTES CABLEE JST**
L = 260 mm

Code: **XBA396A**

Tolérance Générale: - | Etat de Surf.: -

Matière: -

Traitement: -

Revêtement: -

Plan: **XBA396AS** | Ind.: **A** | Format: **A4** | Ech.: -

HEMATOLOGIE

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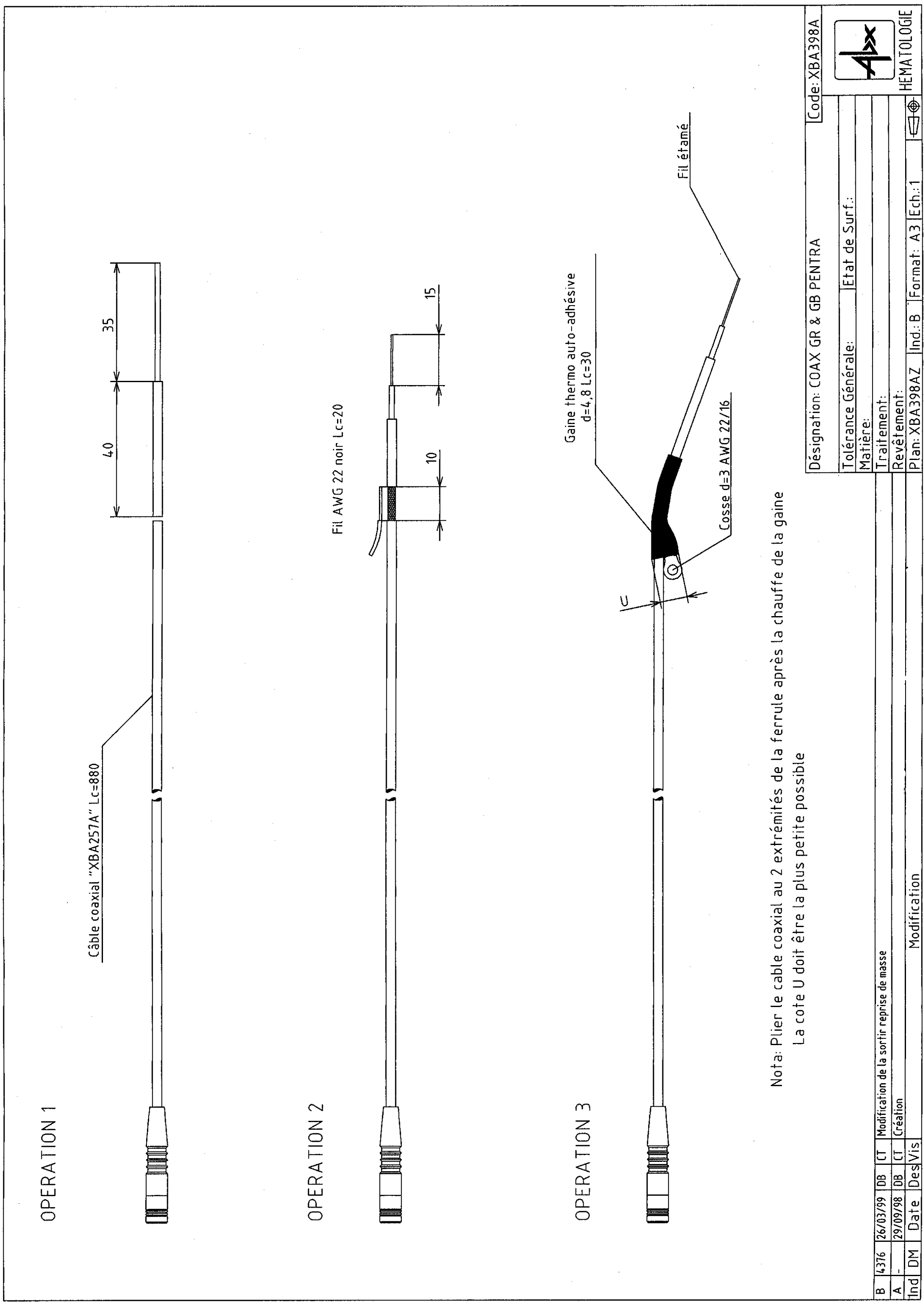
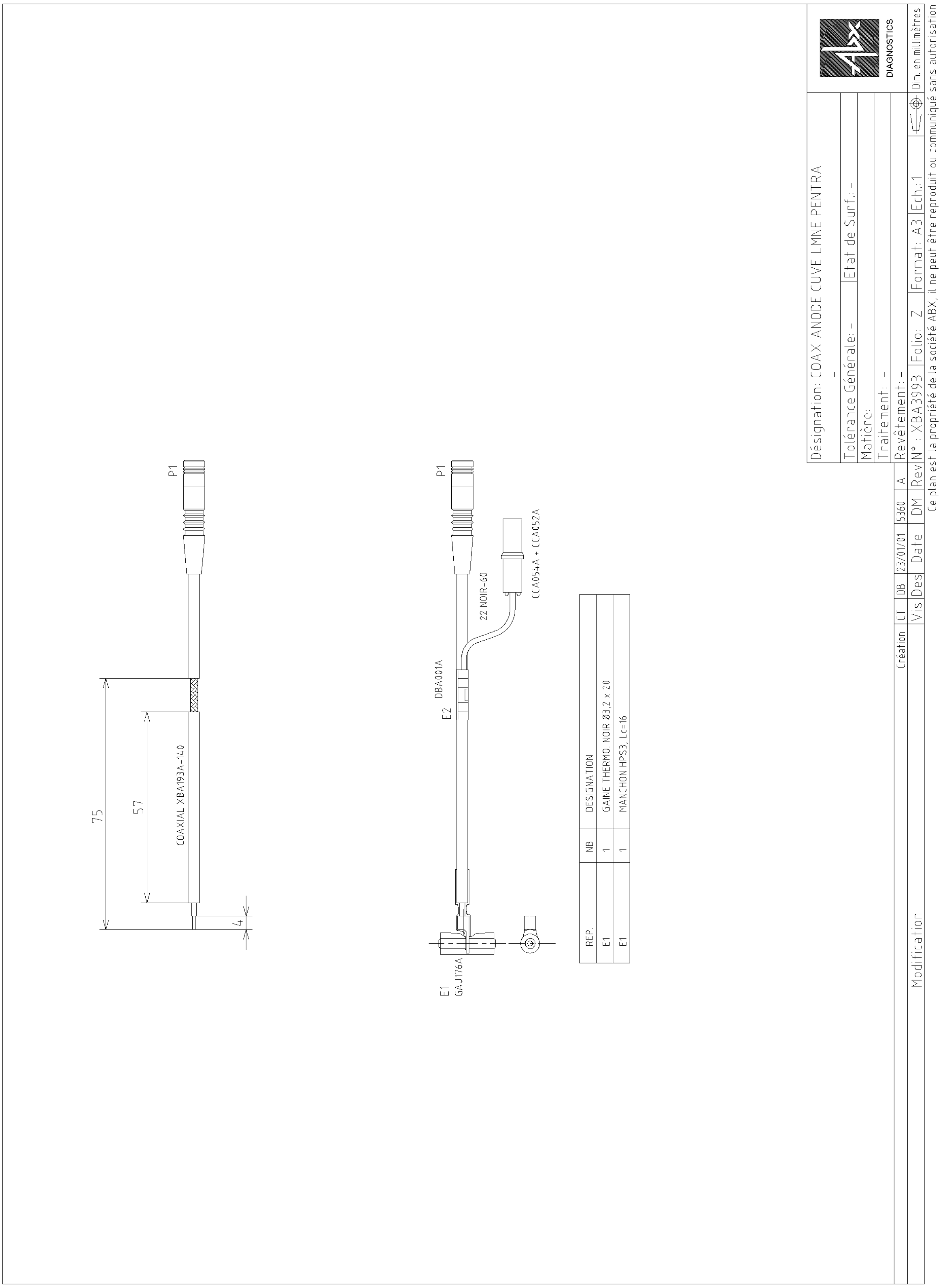
Diag.25:XBA396A Infrared 260mm.

3.24. XBA398B RBC&WBC electrode coaxial cable


OPERATION 1
Câble coaxial "XBA257A" Lc=880
40
35
OPERATION 2
Fil AWG 22 noir Lc=20
10
15
OPERATION 3
Gaine thermo auto-adhésive d=4,8 Lc=30
Cosse d=3 AWG 22/16
Fil étamé
U
Nota: Plier le cable coaxial au 2 extrémités de la ferrule après la chauffe de la gaine
La cote U doit être la plus petite possible
Code: XBA398A
HEMATOLOGIE
Désignation: COAX GR & GB PENTRA
Tolérance Générale:
Etat de Surf.:
Matière:
Traitement:
Revêtement:
Plan: XBA398AZ
Ind.: B
Format: A3
Ech.:1
Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation
B 4376 26/03/99 DB CT Modification de la sortir reprise de masse
A - 29/09/98 DB CT Création
Ind DM Date Des Vis Modification

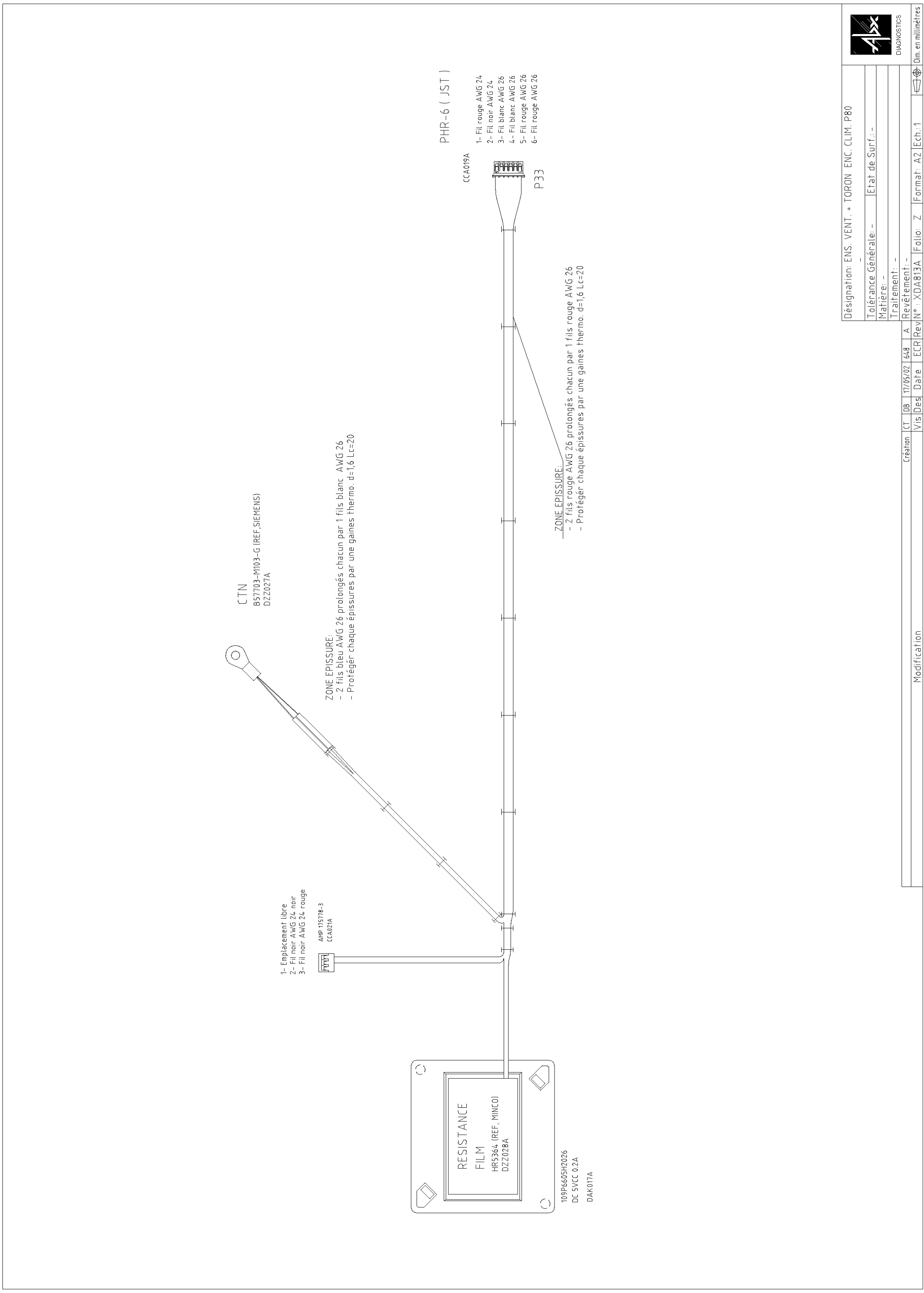
Diag.26:XBA398B RBC&WBC electrode coaxial cable

3.25. XBA399B LMNE flowcell coaxial cable


P1
75
57
4
COAXIAL XBA193A-140
P1
22 NOIR-60
CCA054A + CCA052A
DBA001A
E2
E1
GAU176A
REP. | NB | DESIGNATION
E1 | 1 | GAINE THERMO. NOIR Ø3,2 x 20
E1 | 1 | MANCHON HPS3, Lc=16
DIAGNOSTICS
Désignation: COAX ANODE CUVE LMNE PENTRA
-
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement: -
Dim. en millimètres
Création
CT
DB
23/01/01
5360
A
Vis
Des
Date
DM
Rev
N°: XBA399B
Folio: Z
Format: A3
Ech.:1
Modification
Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

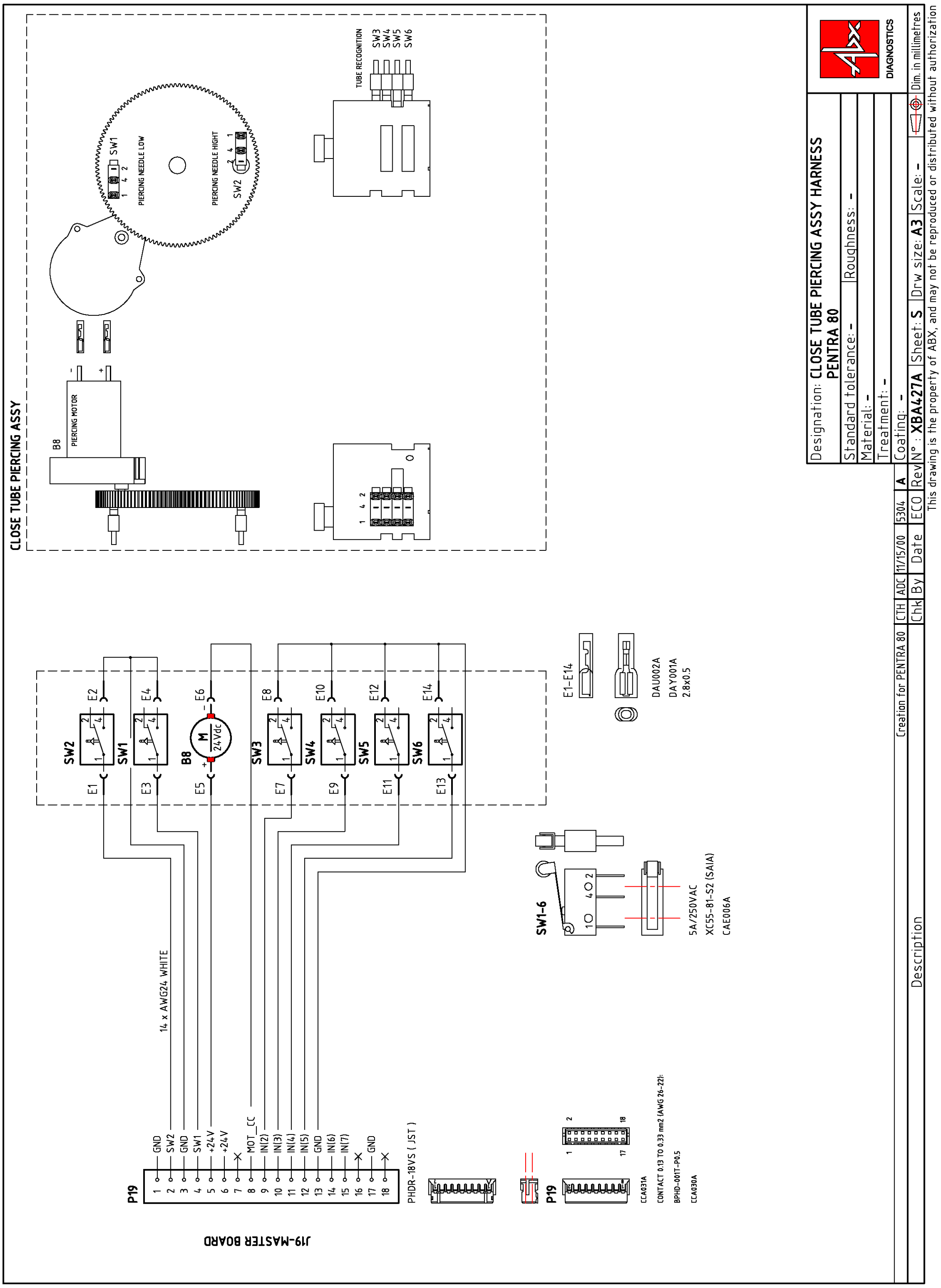
Diag.27:XBA399B LMNE flowcell coaxial cable

3.26. XBA425A Chamber heating


PHR-6 (JST)
1- Fil rouge AWG 24
2- Fil noir AWG 24
3- Fil blanc AWG 26
4- Fil blanc AWG 26
5- Fil rouge AWG 26
6- Fil rouge AWG 26
CCA019A
P33
ZONE EPISSURE:
- 2 fils rouge AWG 26 prolongés chacun par 1 fils rouge AWG 26
- Protégér chaque épissures par une gaines thermo. d=1,6 Lc=20
CTN
B57703-M103-G (REF,SIEMENS)
DZZ027A
ZONE EPISSURE:
- 2 fils bleu AWG 26 prolongés chacun par 1 fils blanc AWG 26
- Protégér chaque épissures par une gaines thermo. d=1,6 Lc=20
1- Emplacement libre
2- Fil noir AWG 24 noir
3- Fil noir AWG 24 rouge
AMP 175778-3
CCA021A
RESISTANCE
FILM
HR5364 (REF, MINCO)
DZZ028A
109P6605H2026
DC 5VCC 0.2A
DAK017A
Désignation: ENS. VENT. + TORON ENC. CLIM. P80
-
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement: -
Création
CT
DB
17/05/02
648
A
Vis
Des
Date
ECR
Rev
N° : XDA813A
Folio: Z
Format: A2
Ech.:1
DIAGNOSTICS
Dim. en millimètres
Modification
Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

Diag.28:XBA425A Chamber heating

3.27. XBA427A Emergency position assy


CLOSE TUBE PIERCING ASSY
B8
PIERCING MOTOR
PIERCING NEEDLE LOW
PIERCING NEEDLE HIGHT
SW1
SW2
TUBE RECOGNITION
SW3
SW4
SW5
SW6
M
24Vdc
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14
E1-E14
DAU002A
DAY001A
2.8x0.5
SW1-6
5A/250VAC
XC55-81-S2 (SAIA)
CAE006A
14 x AWG24 WHITE
P19
GND
SW2
GND
SW1
+24V
+24V
MOT_CC
IN(2)
IN(3)
IN(4)
IN(5)
GND
IN(6)
IN(7)
GND
PHDR-18VS (JST)
CCA031A
CONTACT 0.13 TO 0.33 mm2 (AWG 26-22)
BPHD-001T-P0.5
CCA030A
J19-MASTER BOARD
Creation for PENTRA 80
CTH ADC 11/15/00 5304 A
Description Chk By Date ECO Rev
Designation: CLOSE TUBE PIERCING ASSY HARNESS PENTRA 80
Standard tolerance: -
Roughness: -
Material: -
Treatment: -
Coating: -
N°: XBA427A Sheet: S Drw size: A3 Scale: -
Dim. in millimetres
DIAGNOSTICS
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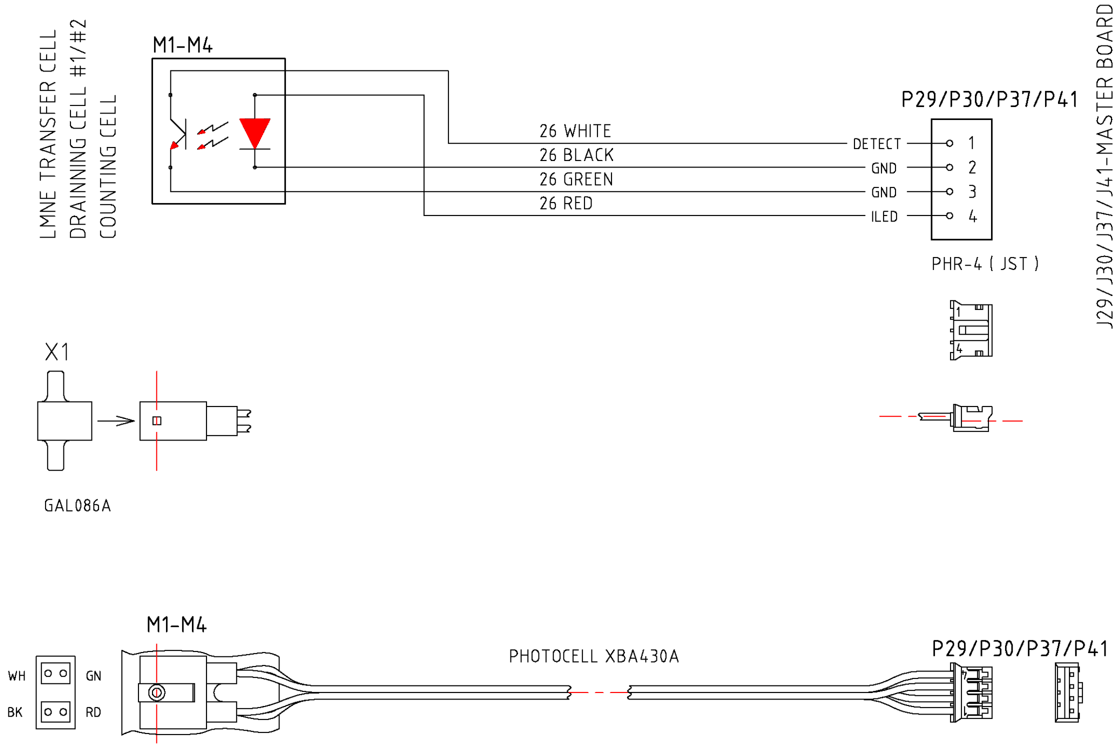
Diag.29:XBA427A Emergency position assy

3.28. XBA431A Infrared photocell 600mm. (No tab)


LMNE TRANSFER CELL
DRAINNING CELL #1/#2
COUNTING CELL
M1-M4
26 WHITE
26 BLACK
26 GREEN
26 RED
P29/P30/P37/P41
DETECT
GND
GND
ILED
1
2
3
4
PHR-4 (JST)
J29/J30/J37/J41-MASTER BOARD
X1
GAL086A
M1-M4
WH
GN
BK
RD
PHOTOCELL XBA430A
P29/P30/P37/P41

REP.	NB	DESIGNATION
M1-M4	1	GAINE THERMO. ADH. Ø12.7 x 30

Description	Chk	By	Date	ECO	Rev
Creation for PENTRA-80	CTH	ADC	30/06/00	5304	A

Designation: PHOTOCELL WITH NO TAB / JST + PLEXI
L = 600

Standard tolerance: - Roughness: -

Material: -

Treatment: -

Coating: -

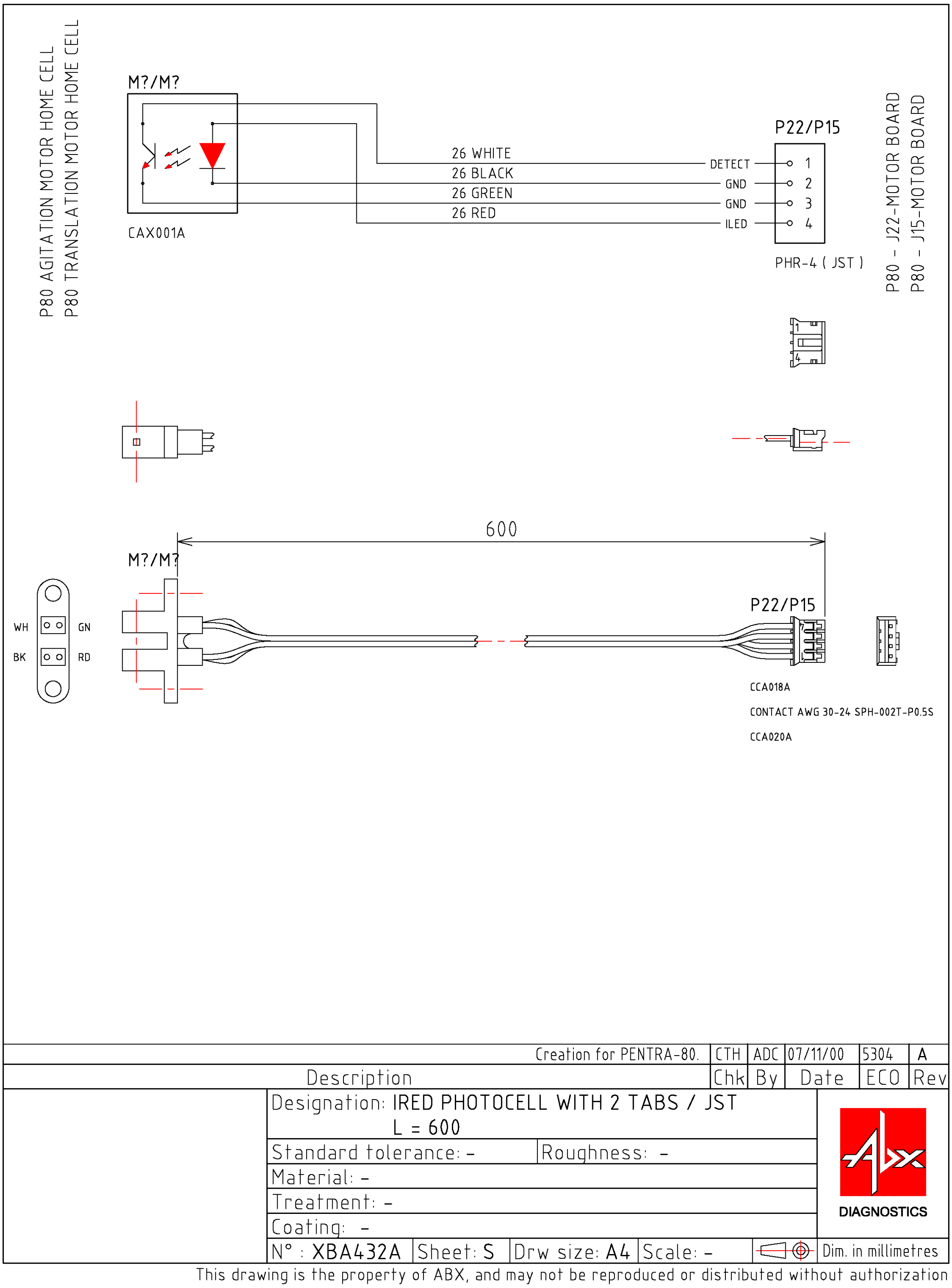
N° : XBA431A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

This drawing is the property of ABX, and may not be reproduced or distributed without authorization

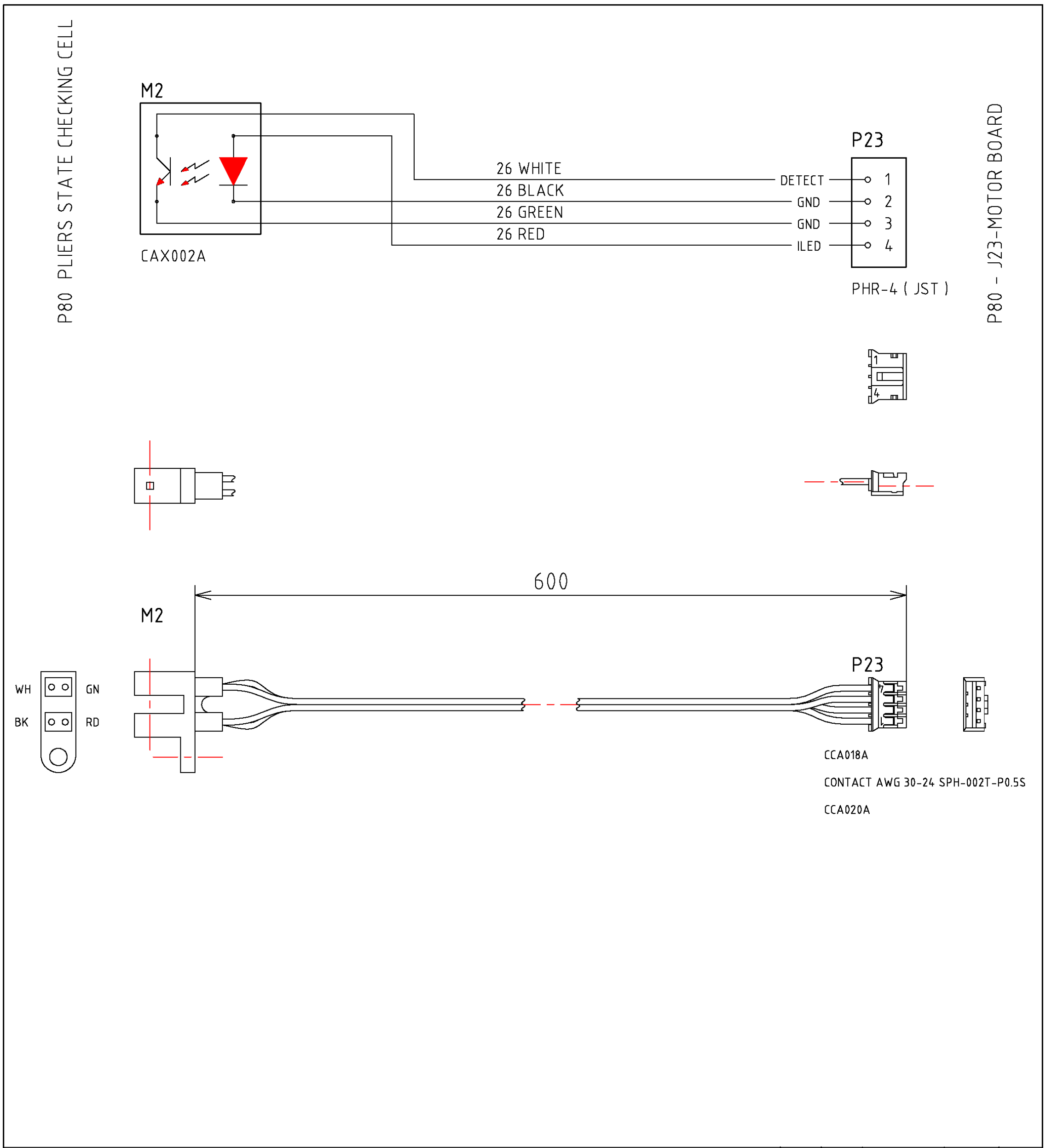
Diag.30:XBA431A Infrared photocell 600mm. (No tab)

3.29. XBA432A Infrared photocell 600mm. (2 tabs)


P80 AGITATION MOTOR HOME CELL
P80 TRANSLATION MOTOR HOME CELL
M?/M?
CAX001A
26 WHITE
26 BLACK
26 GREEN
26 RED
DETECT
GND
GND
ILED
P22/P15
1
2
3
4
PHR-4 (JST)
P80 - J22-MOTOR BOARD
P80 - J15-MOTOR BOARD
600
M?/M?
P22/P15
WH
GN
BK
RD
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
Creation for PENTRA-80.
CTH
ADC
07/11/00
5304
A
Description
Chk
By
Date
ECO
Rev
Designation: IRED PHOTOCELL WITH 2 TABS / JST
L = 600
Standard tolerance: -
Roughness: -
Material: -
Treatment: -
Coating: -
N° : XBA432A
Sheet: S
Drw size: A4
Scale: -
Dim. in millimetres
DIAGNOSTICS
This drawing is the property of ABX, and may not be reproduced or distributed without authorization

Diag.31:XBA432A Infrared photocell 600mm. (2 tabs)

3.30. XBA433A Infrared photocell 600mm. (1 tab)


P80 PLIERS STATE CHECKING CELL
M2
CAX002A
26 WHITE
26 BLACK
26 GREEN
26 RED
DETECT
GND
GND
ILED
1
2
3
4
P23
PHR-4 (JST)
P80 - J23-MOTOR BOARD
1
4
600
M2
P23
WH
BK
GN
RD
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A

Description	Chk	By	Date	ECO	Rev
Creation for PENTRA-80.	CTH	ADC	07/11/00	5304	A

Designation: IRED PHOTOCELL WITH 1 TAB / JST
L = 600
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : XBA433A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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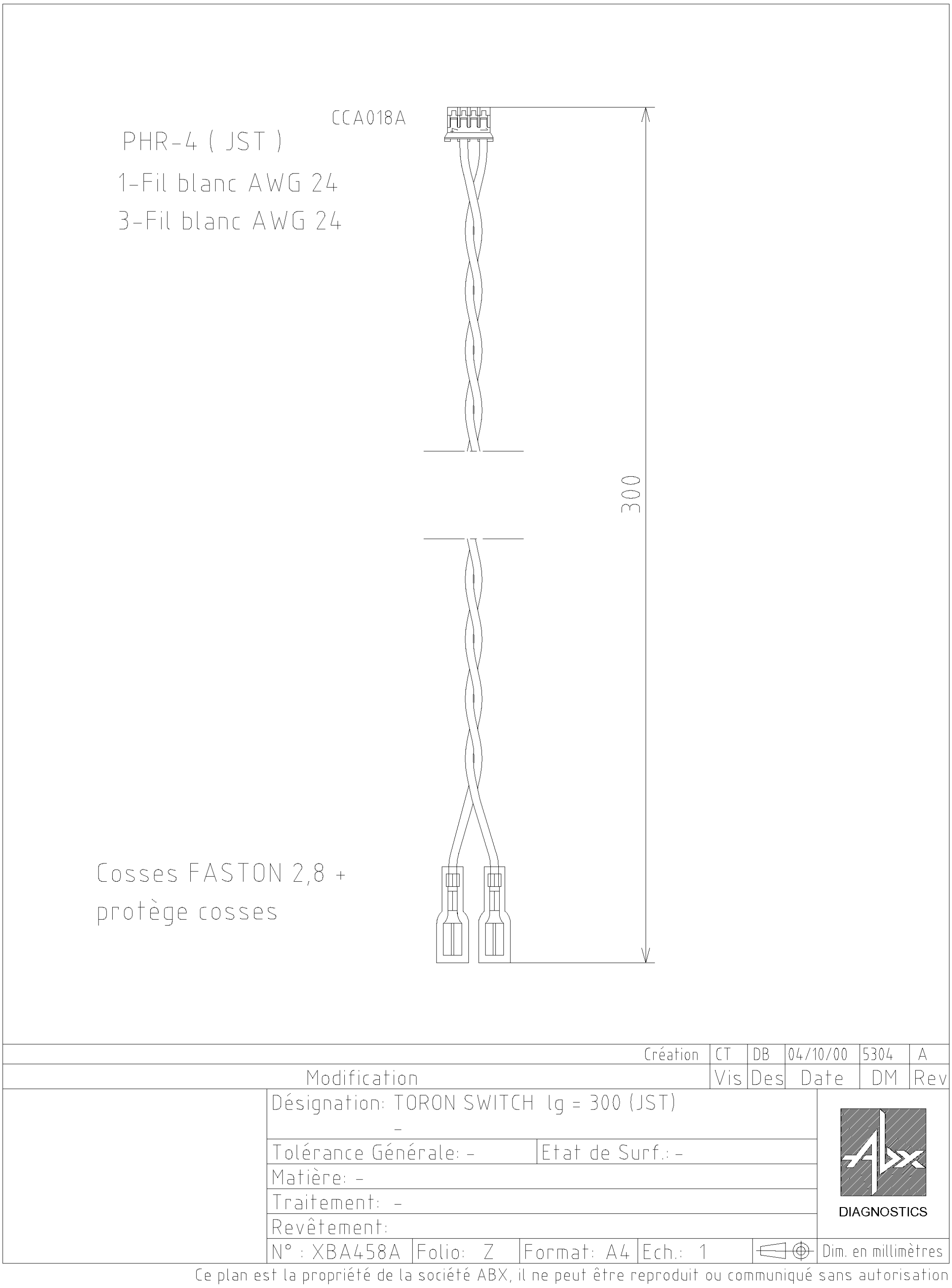
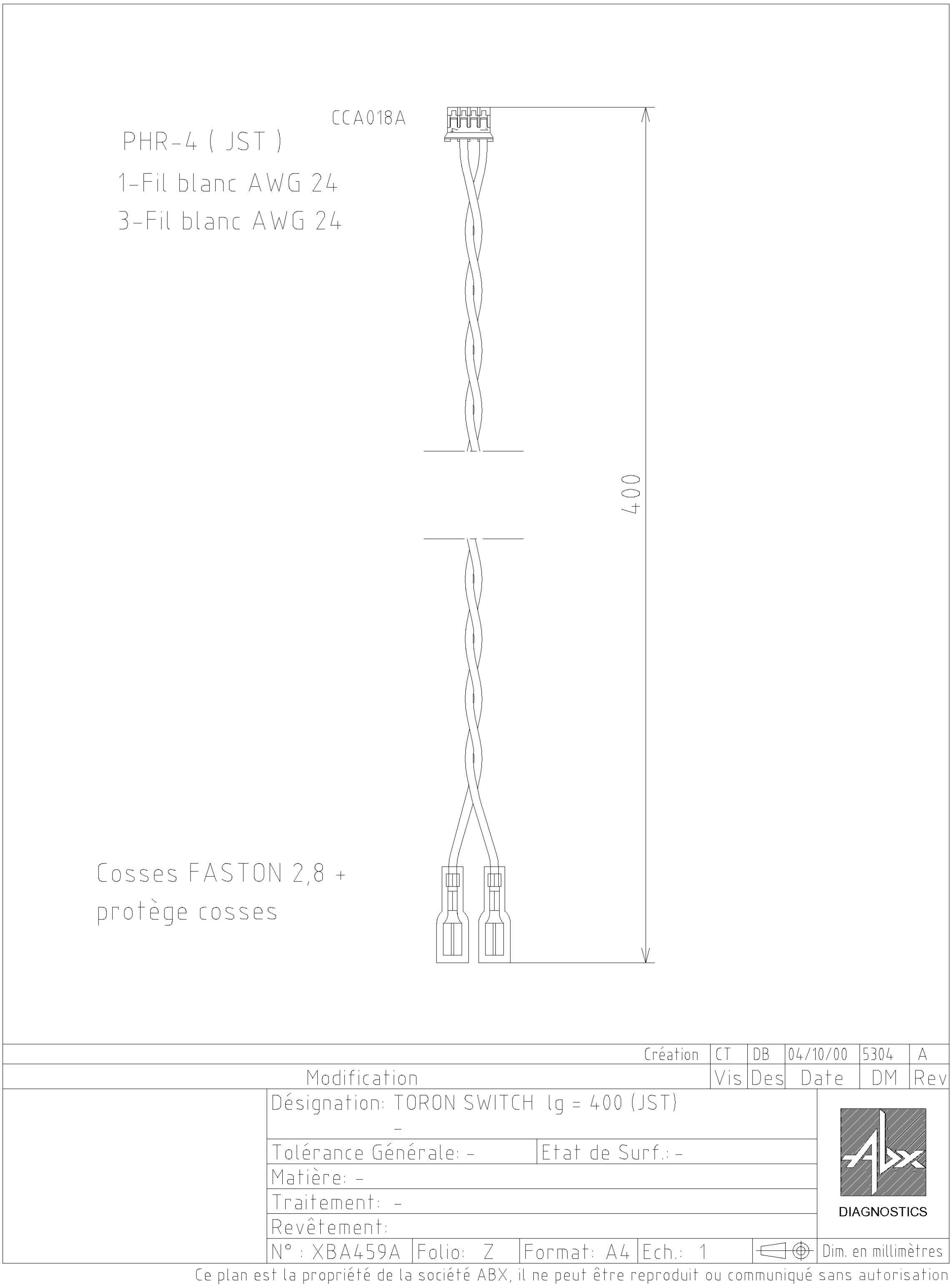
Diag.32:XBA433A Infrared photocell 600mm. (1 tab)

3.31. XBA458A Switch JST 300mm.


CCA018A
PHR-4 (JST)
1-Fil blanc AWG 24
3-Fil blanc AWG 24
300
Cosses FASTON 2,8 +
protège cosses
Création CT DB 04/10/00 5304 A
Modification Vis Des Date DM Rev
Désignation: TORON SWITCH lg = 300 (JST)
-
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement:
N° : XBA458A
Folio: Z
Format: A4
Ech.: 1
Dim. en millimètres
ABX
DIAGNOSTICS
Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

Diag.33:XBA458A Switch JST 300mm.

3.32. XBA459A Switch JST 400mm.


CCA018A
PHR-4 (JST)
1-Fil blanc AWG 24
3-Fil blanc AWG 24
400
Cosses FASTON 2,8 +
protège cosses
DIAGNOSTICS

Création CT DB 04/10/00 5304 A

Modification Vis Des Date DM Rev

Désignation: TORON SWITCH lg = 400 (JST)

Tolérance Générale: - Etat de Surf.: -

Matière: -

Traitement: -

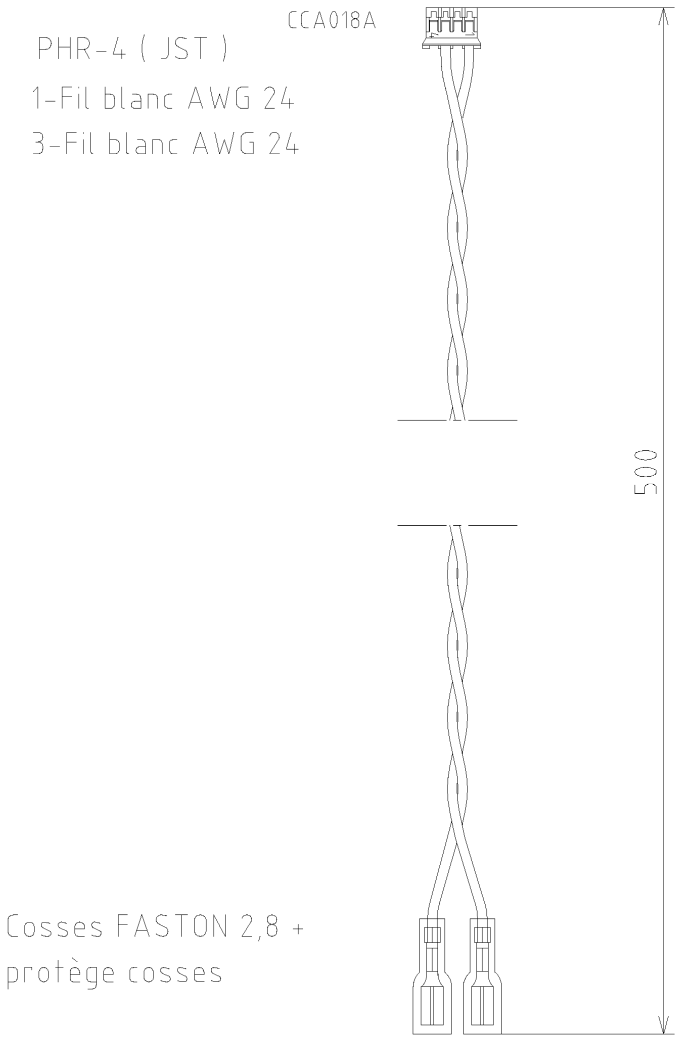
Revêtement:

N° : XBA459A Folio: Z Format: A4 Ech.: 1 Dim. en millimètres

Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

Diag.34:XBA459A Switch JST 400mm.

3.33. XBA460A Switch Jst 500mm.


CCA018A
PHR-4 (JST)
1-Fil blanc AWG 24
3-Fil blanc AWG 24
500
Cosses FASTON 2,8 +
protège cosses

Création	CT	DB	04/10/00	5304	A
Modification	Vis	Des	Date	DM	Rev

Désignation: TORON SWITCH lg = 500 (JST)
-

Tolérance Générale: - | Etat de Surf.: -

Matière: -

Traitement: -

Revêtement:

N° : XBA460A | Folio: Z | Format: A4 | Ech.: 1 | Dim. en millimètres

DIAGNOSTICS

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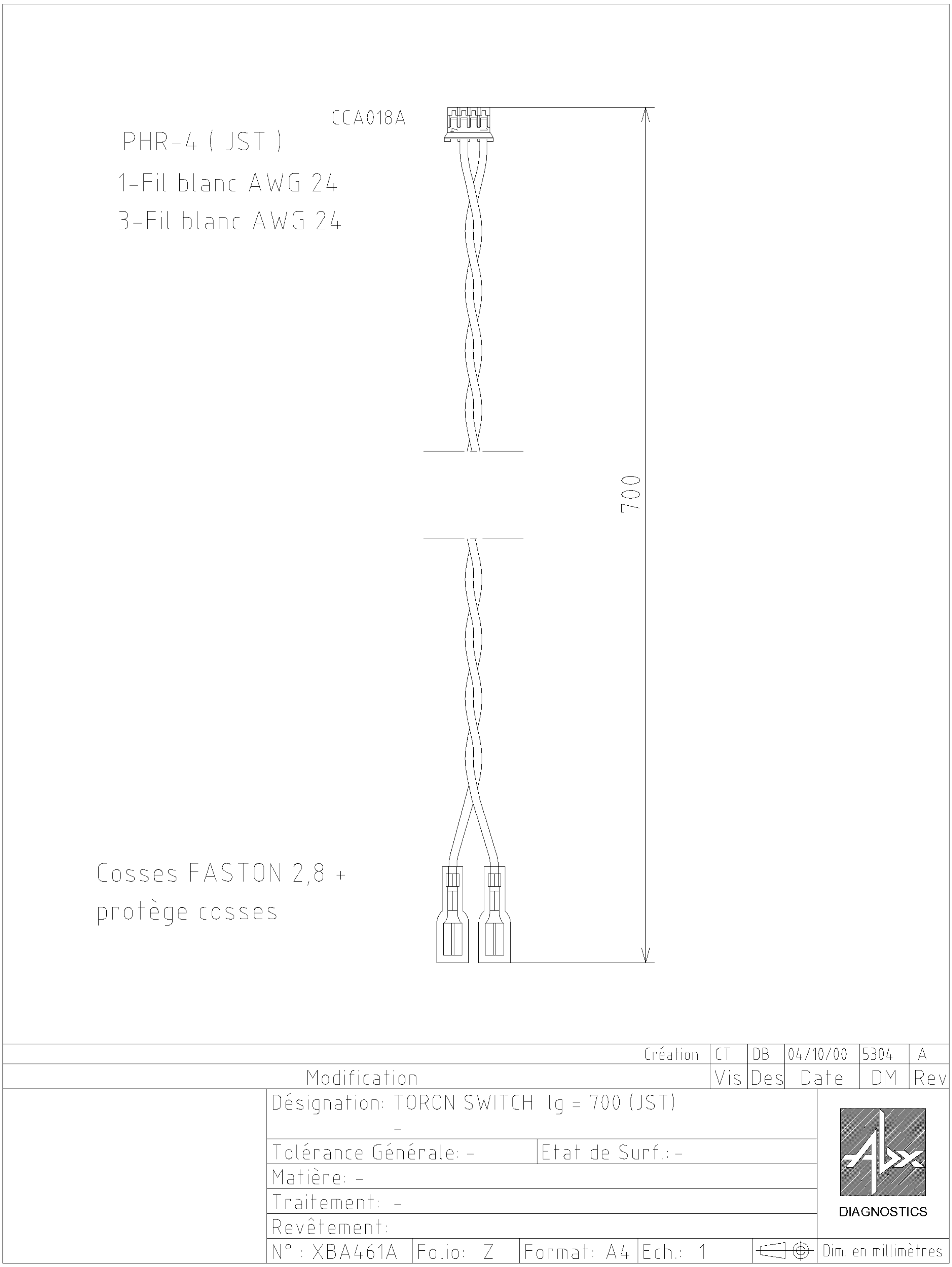
Diag.35:XBA460A Switch Jst 500mm.

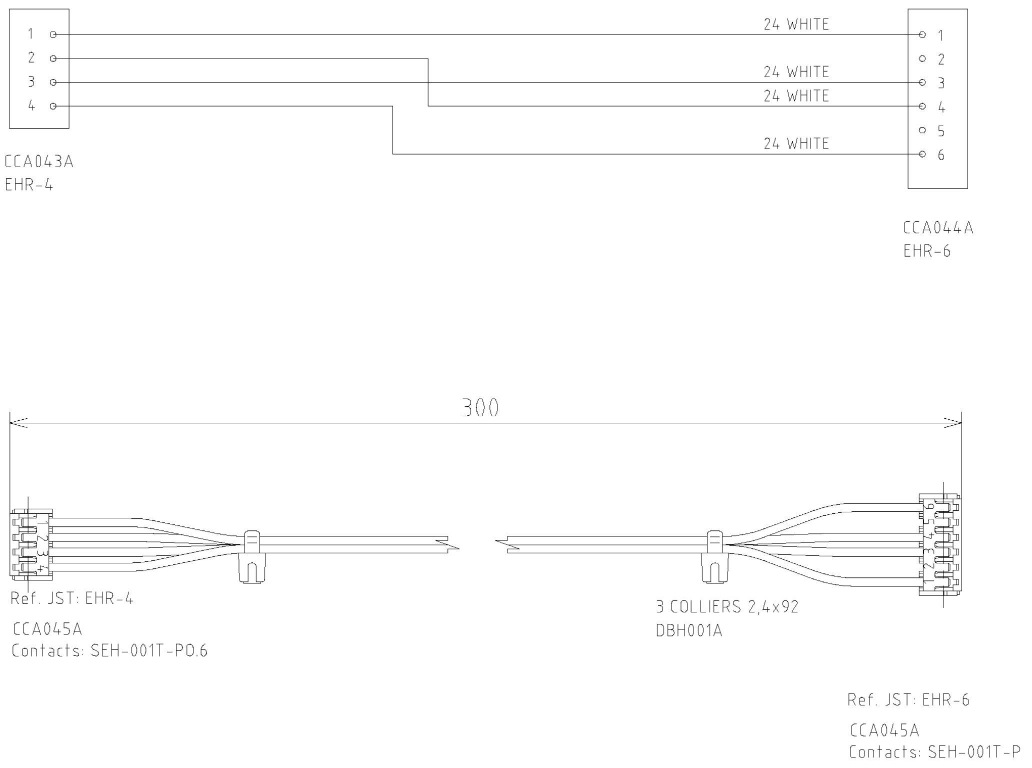
3.34. XBA461A Switch Jst 700mm.


CCA018A
PHR-4 (JST)
1-Fil blanc AWG 24
3-Fil blanc AWG 24
700
Cosses FASTON 2,8 +
protège cosses
Création
CT
DB
04/10/00
5304
A
Modification
Vis
Des
Date
DM
Rev
Désignation: TORON SWITCH lg = 700 (JST)
-
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement:
N° : XBA461A
Folio: Z
Format: A4
Ech.: 1
Dim. en millimètres
DIAGNOSTICS

Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

Diag.36:XBA461A Switch Jst 700mm.

3.35. XBA462A Motor Jst 300mm.


1
2
3
4
CCA043A
EHR-4
24 WHITE
24 WHITE
24 WHITE
24 WHITE
1
2
3
4
5
6
CCA044A
EHR-6
300
1
2
3
4
Ref. JST: EHR-4
CCA045A
Contacts: SEH-001T-P0.6
3 COLLIERS 2,4x92
DBH001A
1
2
3
4
5
6
Ref. JST: EHR-6
CCA045A
Contacts: SEH-001T-P

Création	CT	DB	06/10/00	5304	A
Modification	Vis	Des	Date	DM	Rev

Désignation: TORON MOTEUR lg = 300 (JST)
-
Tolérance Générale: - Etat de Surf.: -
Matière: -
Traitement: -
Revêtement:
N° : XBA462A Folio: Z Format: A4 Ech.: - Dim. en millimètres

DIAGNOSTICS

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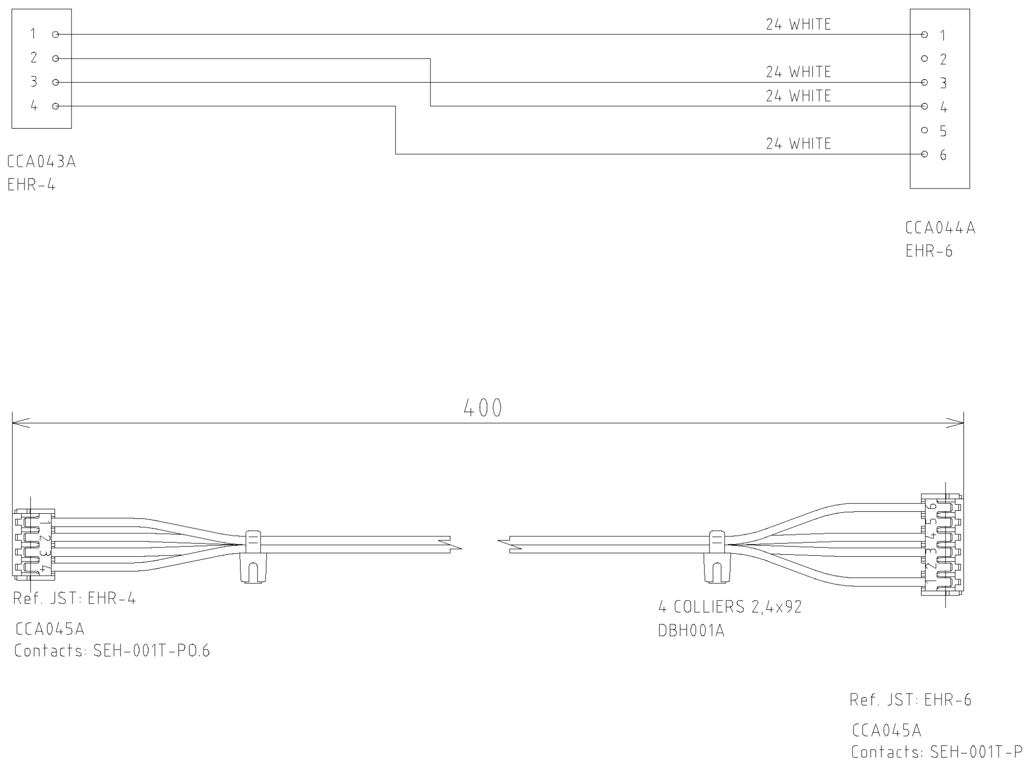
Diag.37:XBA462A Motor Jst 300mm.

3.36. XBA463A Motor Jst 400mm.


1
2
3
4
CCA043A
EHR-4
24 WHITE
24 WHITE
24 WHITE
24 WHITE
1
2
3
4
5
6
CCA044A
EHR-6
400
1
2
3
4
Ref. JST: EHR-4
CCA045A
Contacts: SEH-001T-P0.6
4 COLLIERS 2,4x92
DBH001A
6
5
4
3
2
Ref. JST: EHR-6
CCA045A
Contacts: SEH-001T-P

Création	CT	DB	06/10/00	5304	A
Modification	Vis	Des	Date	DM	Rev

Désignation: TORON MOTEUR lg = 400 (JST)
-
Tolérance Générale: - Etat de Surf.: -
Matière: -
Traitement: -
Revêtement:
N° : XBA463A Folio: Z Format: A4 Ech.: - Dim. en millimètres

DIAGNOSTICS

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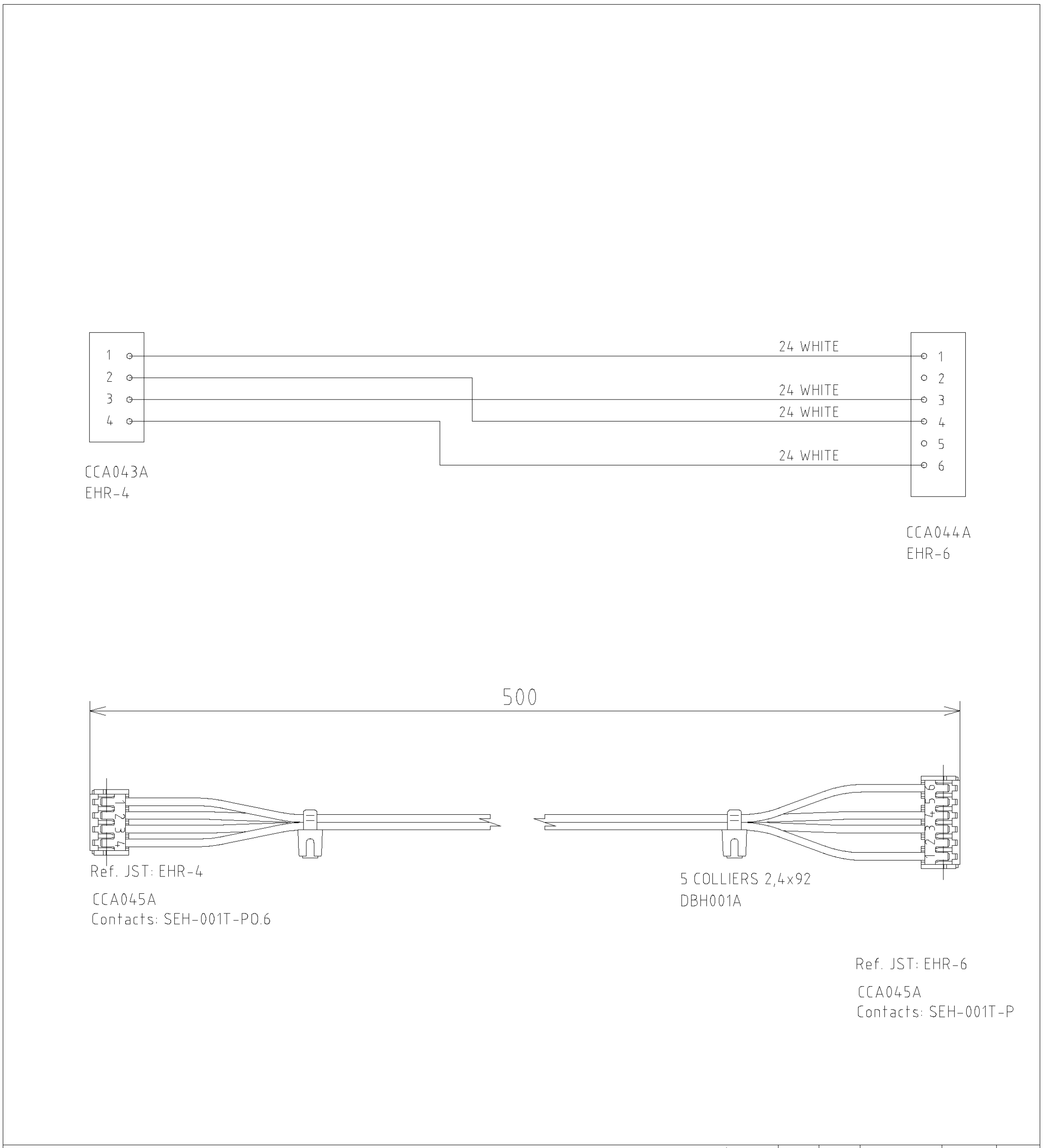
Diag.38:XBA463A Motor Jst 400mm.

3.37. XBA464A Motor Jst 500mm.


1
2
3
4
CCA043A
EHR-4
24 WHITE
24 WHITE
24 WHITE
24 WHITE
1
2
3
4
5
6
CCA044A
EHR-6
500
1 2 3 4
6 5 4 3 2 1
Ref. JST: EHR-4
CCA045A
Contacts: SEH-001T-P0.6
5 COLLIERS 2,4x92
DBH001A
Ref. JST: EHR-6
CCA045A
Contacts: SEH-001T-P

Création	CT	DB	06/10/00	5304	A
Modification	Vis	Des	Date	DM	Rev

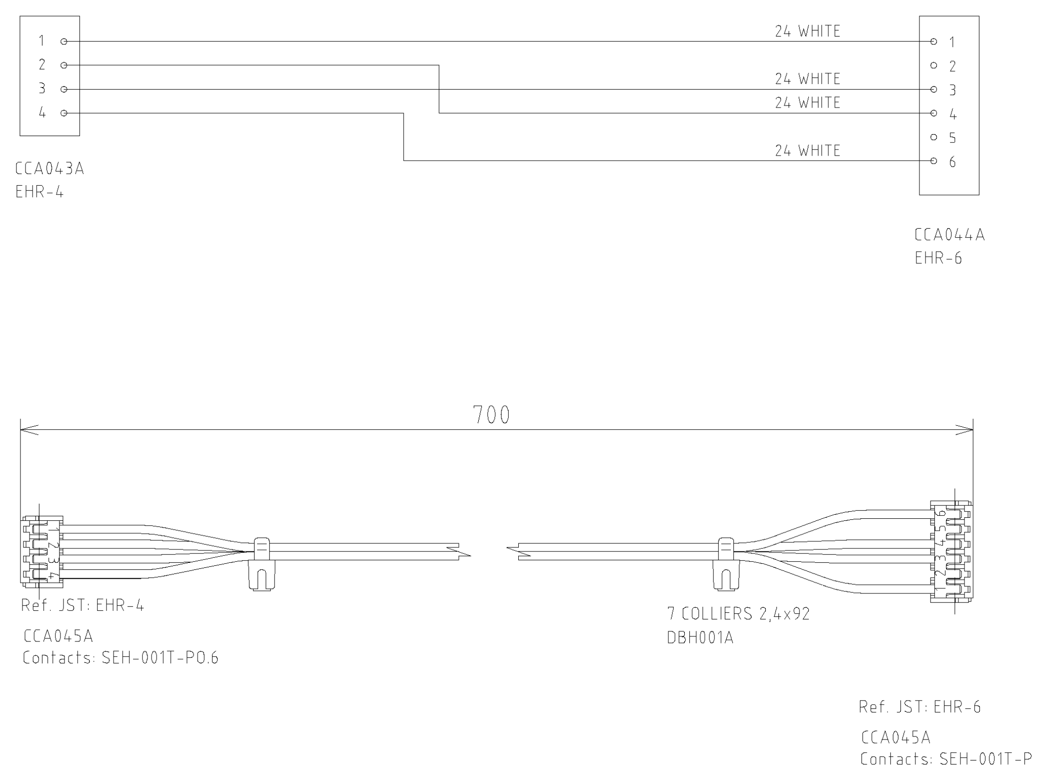
Désignation: TORON MOTEUR lg = 500 (JST)
-
Tolérance Générale: - Etat de Surf.: -
Matière: -
Traitement: -
Revêtement:
N° : XBA464A Folio: Z Format: A4 Ech.: - Dim. en millimètres

DIAGNOSTICS

Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

Diag.39:XBA464A Motor Jst 500mm.

3.38. XBA465A Motor Jst 700mm.


1
2
3
4
24 WHITE
24 WHITE
24 WHITE
24 WHITE
1
2
3
4
5
6
CCA043A
EHR-4
CCA044A
EHR-6
700
Ref. JST: EHR-4
CCA045A
Contacts: SEH-001T-P0.6
7 COLLIERS 2,4x92
DBH001A
Ref. JST: EHR-6
CCA045A
Contacts: SEH-001T-P

Création	CT	DB	06/10/00	5304	A
Modification	Vis	Des	Date	DM	Rev

Désignation: TORON MOTEUR lg = 700 (JST)
-

Tolérance Générale: -	Etat de Surf.: -

Matière: -
Traitement: -
Revêtement:

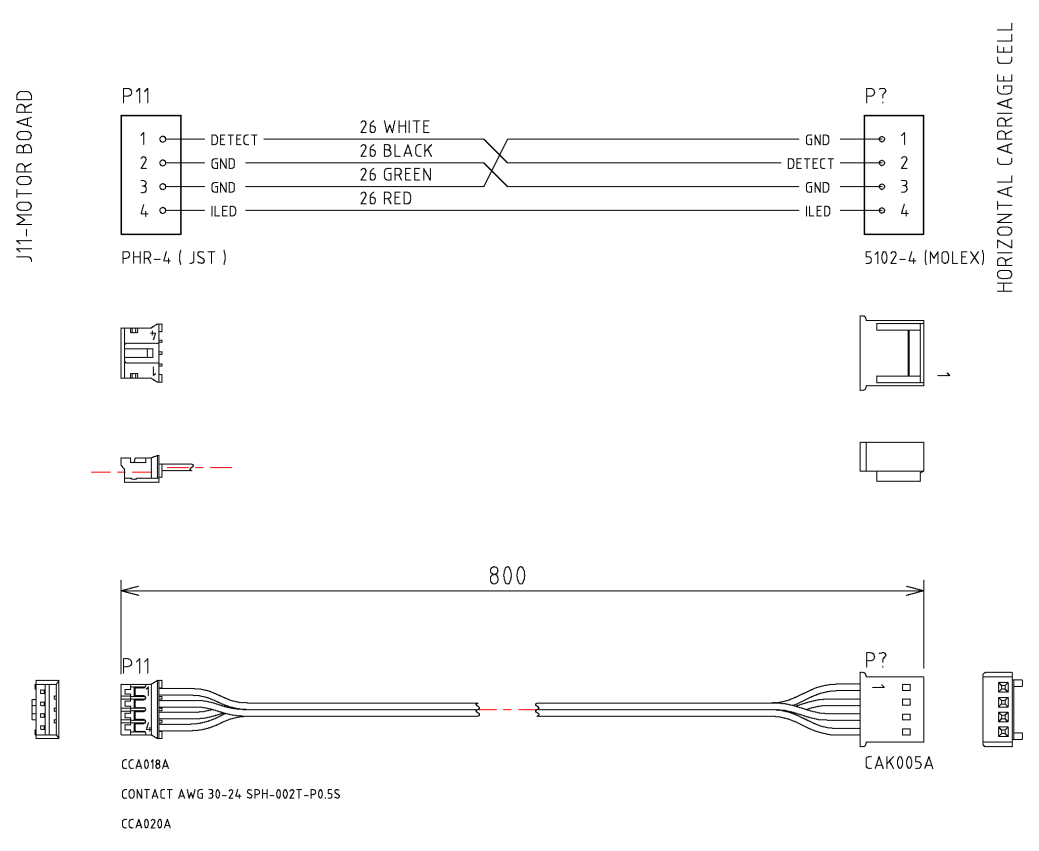
N° : XBA465A	Folio: Z	Format: A4	Ech.: -	Dim. en millimètres

DIAGNOSTICS

Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

Diag.40:XBA465A Motor Jst 700mm.

3.39. XBA469A Horizontal carriage cell extension


J11-MOTOR BOARD
P11
1 DETECT
2 GND
3 GND
4 ILED
26 WHITE
26 BLACK
26 GREEN
26 RED
GND 1
DETECT 2
GND 3
ILED 4
P?
PHR-4 (JST)
5102-4 (MOLEX)
HORIZONTAL CARRIAGE CELL
800
P11
P?
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
CAK005A

Creation for PENTRA-80.	CTH	ADC	07/17/00	5304	A
Description	Chk	By	Date	ECO	Rev

Designation: PHR-4 JST/5102-4 MOLEX HARNESS L = 800
PENTRA 80 HORIZ. CARRIAGE CELL EXTENS°
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : XBA469A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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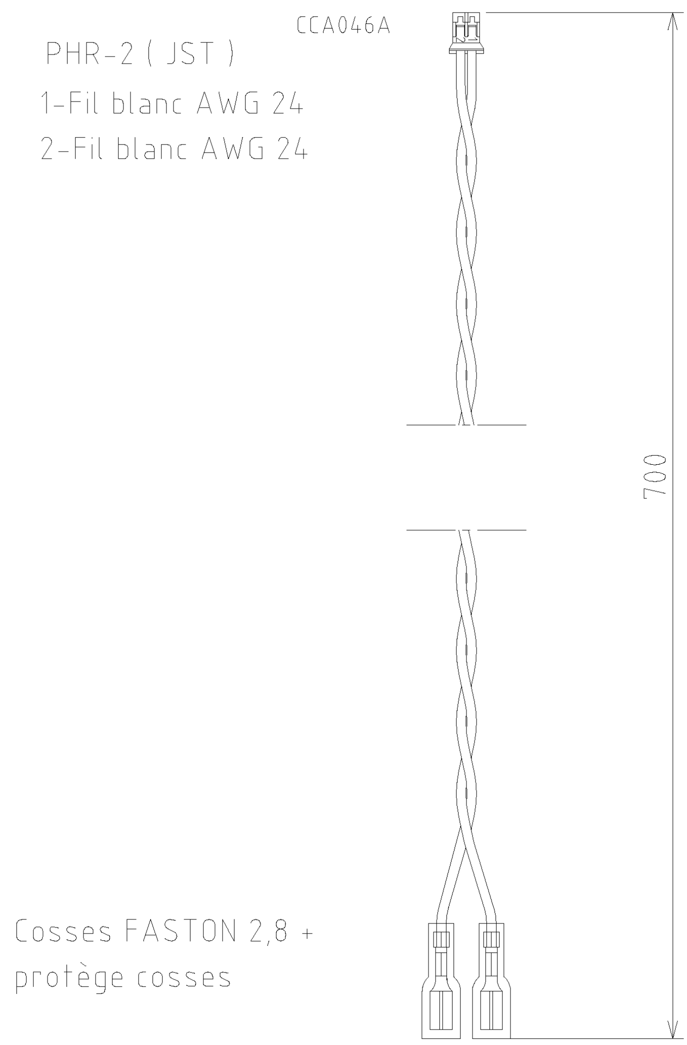
Diag.41:XBA469A Horizontal carriage cell extension

3.40. XBA470A Solenoid JST 700mm.


CCA046A
PHR-2 (JST)
1-Fil blanc AWG 24
2-Fil blanc AWG 24
700
Cosses FASTON 2,8 +
protège cosses

Création	CT	DB	10/10/00	5304	A
Modification	Vis	Des	Date	DM	Rev

Désignation: TORON E.V. lg = 700 (JST 2pts)
-
Tolérance Générale: - | Etat de Surf.: -
Matière: -
Traitement: -
Revêtement:
N° : XBA470A | Folio: Z | Format: A4 | Ech.: - | Dim. en millimètres

DIAGNOSTICS

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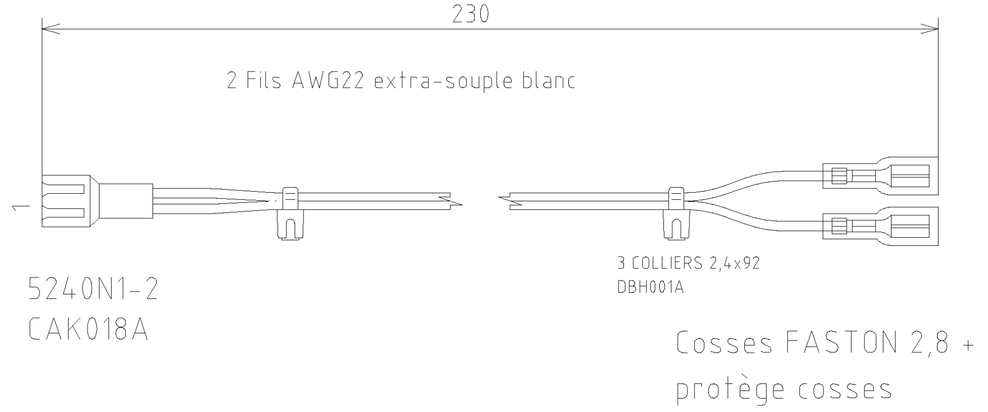
Diag.42:XBA470A Solenoid JST 700mm.

3.41. XBA471A Solenoid Molex 230mm.


230
2 Fils AWG22 extra-souple blanc
1
5240N1-2
CAK018A
3 COLLIERS 2,4x92
DBH001A
Cosses FASTON 2,8 +
protège cosses

Création	CT	DB	11/10/00	5304	A
Modification	Vis	Des	Date	DM	Rev

Désignation: TORON E.V. BARILLET P80
-

Tolérance Générale: - | Etat de Surf.: -

Matière: -

Traitement: -

Revêtement:

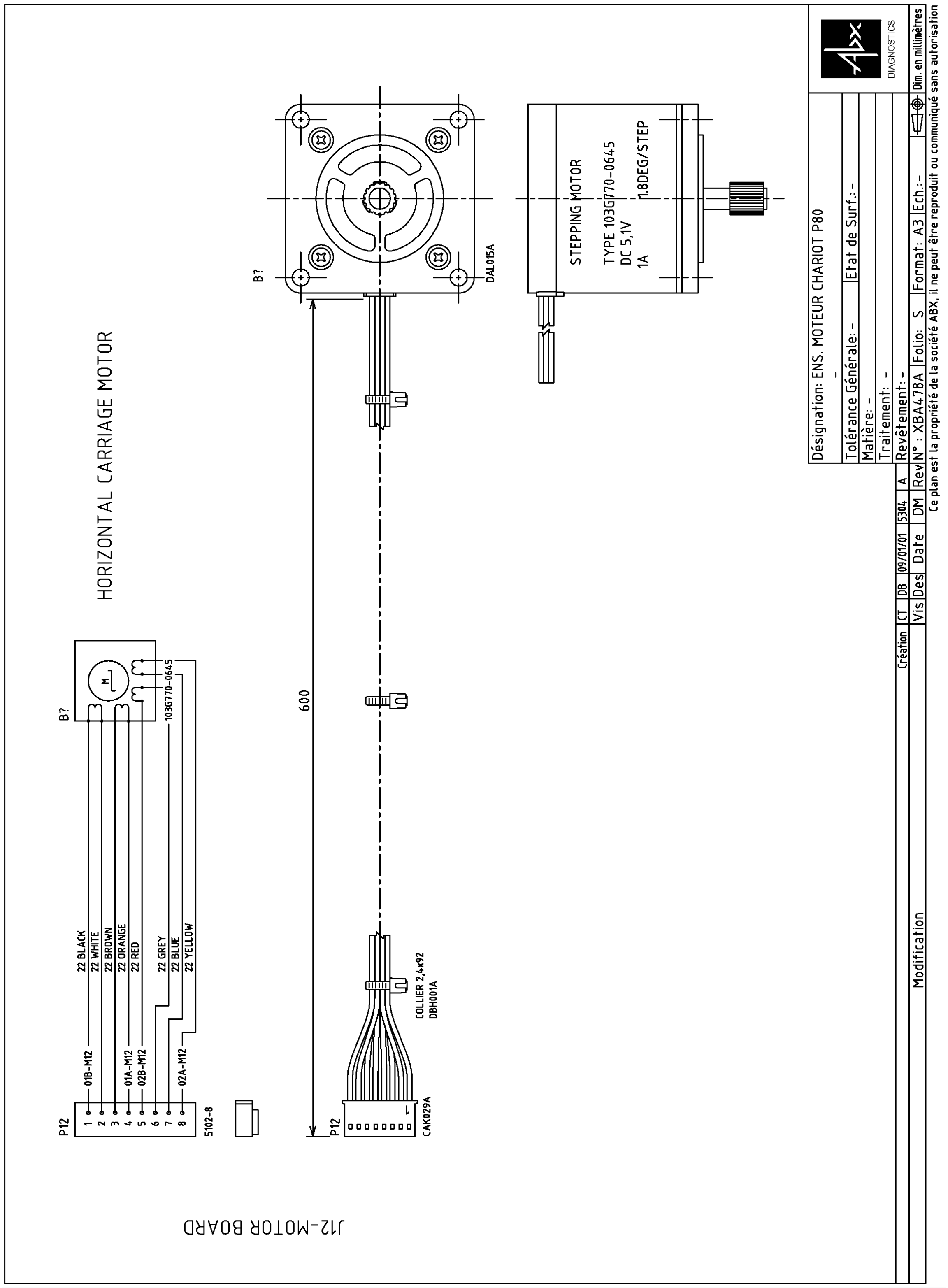
N° : XBA471A | Folio: Z | Format: A4 | Ech.: - | Dim. en millimètres

DIAGNOSTICS

Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

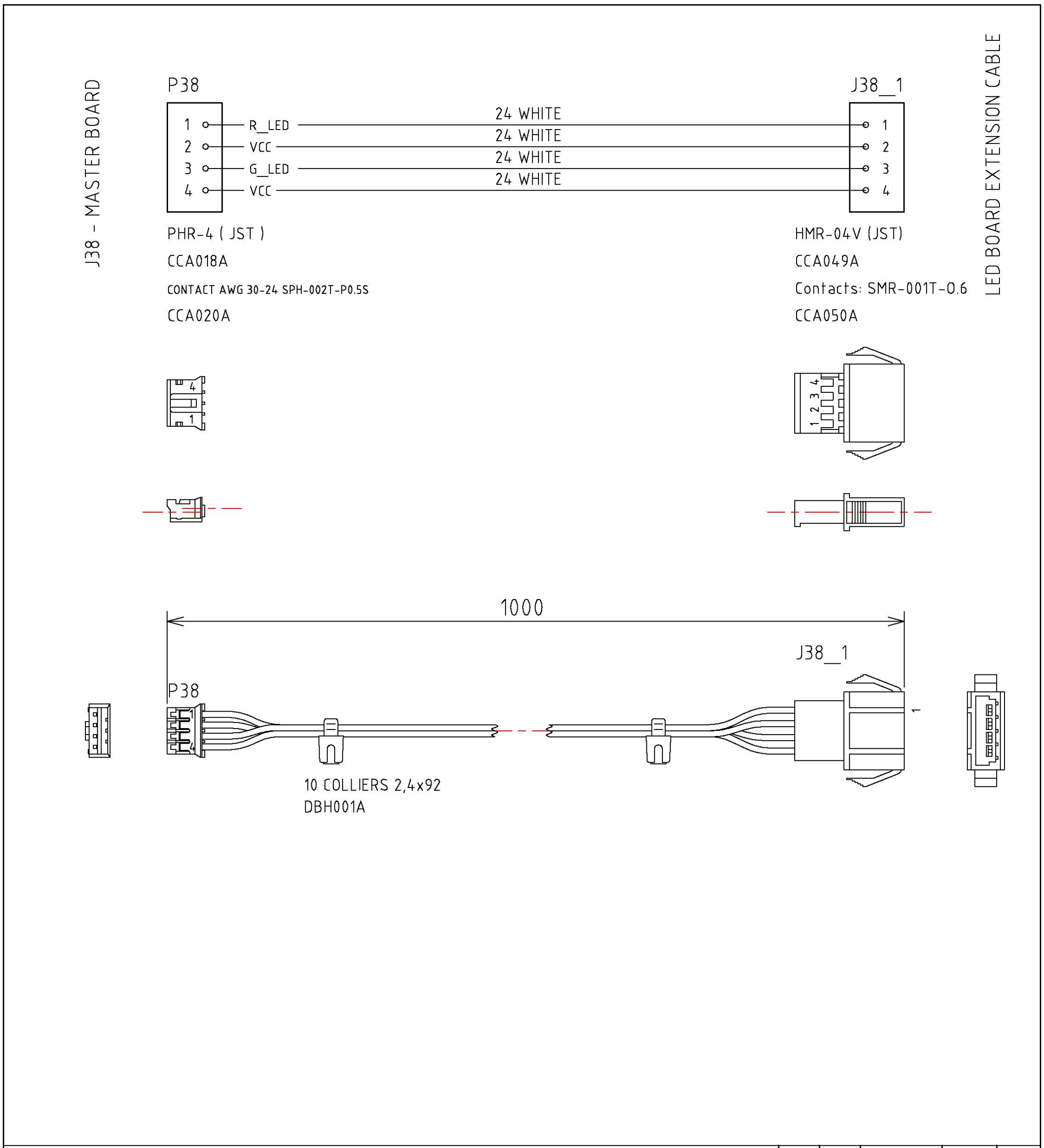
Diag.43:XBA471A Solenoid Molex 230mm.

3.42. XBA478A Horizontal carriage motor


HORIZONTAL CARRIAGE MOTOR
B?
103G770-0645
P12
1
2
3
4
5
6
7
8
5102-8
01B-M12
01A-M12
02B-M12
02A-M12
22 BLACK
22 WHITE
22 BROWN
22 ORANGE
22 RED
22 GREY
22 BLUE
22 YELLOW
J12-MOTOR BOARD
600
B?
DAL015A
STEPPING MOTOR
TYPE 103G770-0645
DC 5,1V
1A
1.8DEG/STEP
COLLIER 2,4x92
DBH001A
P12
CAK029A
DIAGNOSTICS
Désignation: ENS. MOTEUR CHARIOT P80
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement: -
N° : XBA478A
Folio: S
Format: A3
Ech.: -
Dim. en millimètres
Création
CT
DB
09/01/01
5304
A
Modification
Vis
Des
Date
DM
Rev
Ce plan est la propriété de la société ABX, il ne peut être reproduit ou communiqué sans autorisation

Diag.44:XBA478A Horizontal carriage motor

3.43. XBA486A LEDs extension JST 1000mm.


J38 - MASTER BOARD
P38
1 R_LED
2 VCC
3 G_LED
4 VCC
24 WHITE
24 WHITE
24 WHITE
24 WHITE
J38_1
1
2
3
4
LED BOARD EXTENSION CABLE
PHR-4 (JST)
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
HMR-04V (JST)
CCA049A
Contacts: SMR-001T-0.6
CCA050A
1000
J38_1
P38
10 COLLIERS 2,4x92
DBH001A

Creation for PENTRA-80.	CTH	ADC	11/10/00	5304	A
Description	Chk	By	Date	ECO	Rev

Designation: JST PHR-4/HMR-04V HARNESS L = 1000
PENTRA 80 LEDS BOARD EXTENSION
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : XBA486A Sheet: S Drw size: A4 Scale: - Dim. in millimetres
DIAGNOSTICS

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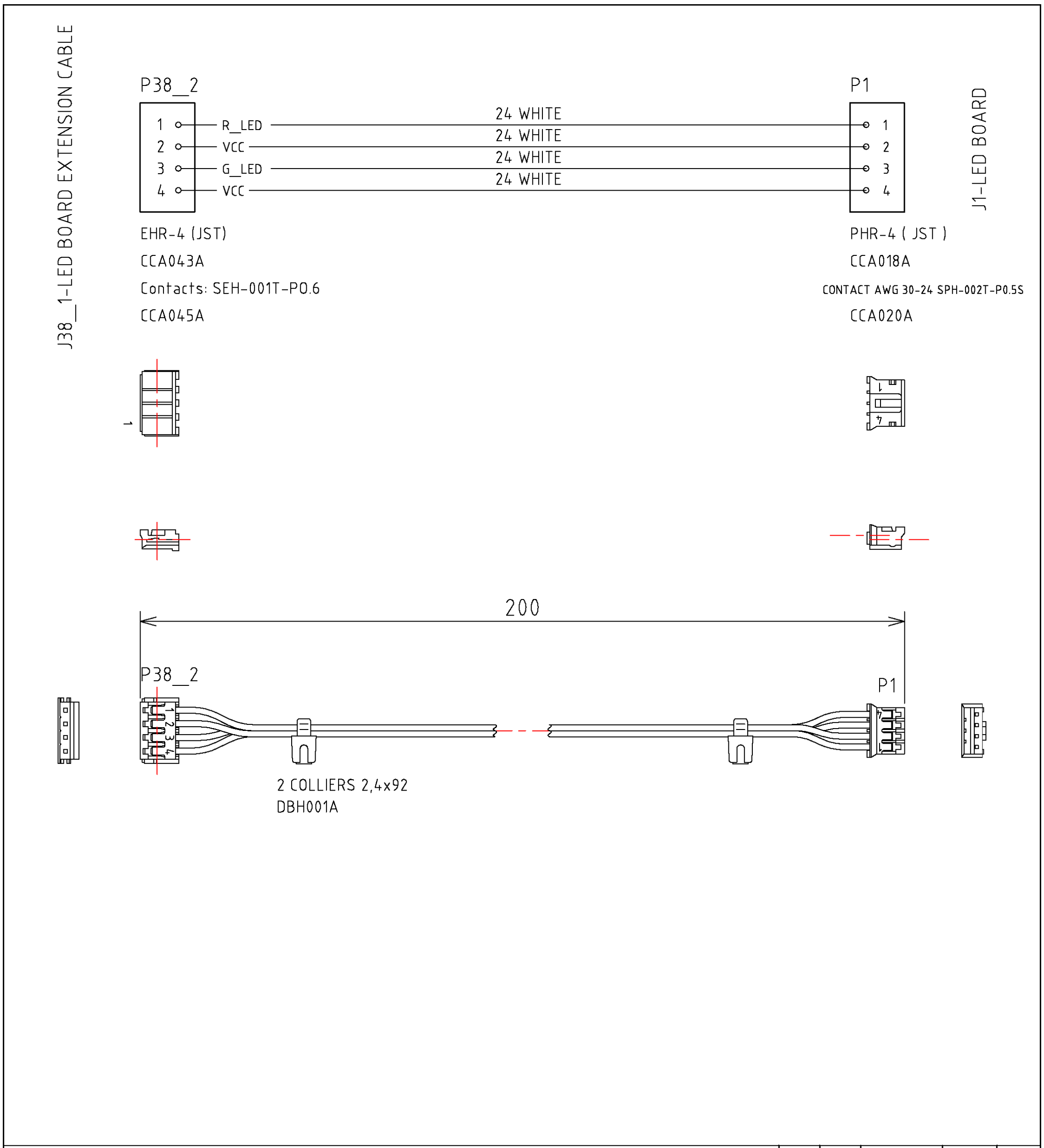
Diag.45:XBA486A LEDs extension JST 1000mm.

3.44. XBA487A LED JST 200mm.


J38__1-LED BOARD EXTENSION CABLE
P38__2
1 R_LED
2 VCC
3 G_LED
4 VCC
24 WHITE
24 WHITE
24 WHITE
24 WHITE
P1
1
2
3
4
J1-LED BOARD
EHR-4 (JST)
CCA043A
Contacts: SEH-001T-P0.6
CCA045A
PHR-4 (JST)
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
1
200
P38__2
P1
2 COLLIERS 2,4x92
DBH001A

Description	Chk	By	Date	ECO	Rev
Creation for PENTRA-80.	CTH	ADC	11/13/00	5304	A

Designation: JST EHR-4/PHR-4 HARNESS L = 200
PENTRA 80 LED BOARD
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : XBA487A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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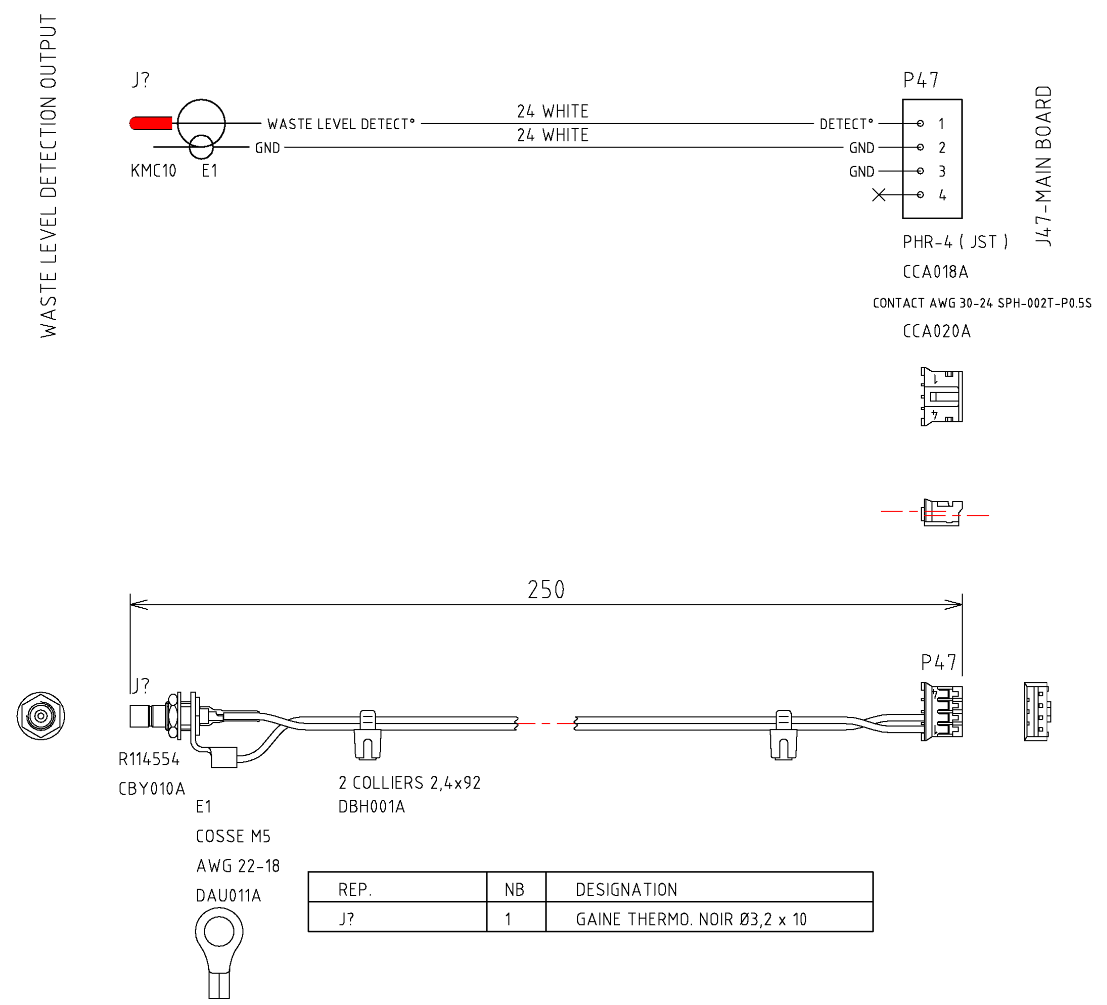
Diag.46:XBA487A LED JST 200mm.

3.45. XBA488A Waste level detection


WASTE LEVEL DETECTION OUTPUT
J?
KMC10
E1
WASTE LEVEL DETECT°
GND
24 WHITE
24 WHITE
DETECT°
GND
GND
P47
1
2
3
4
J47-MAIN BOARD
PHR-4 (JST)
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
250
J?
P47
R114554
CBY010A
E1
COSSE M5
AWG 22-18
DAU011A
2 COLLIERS 2,4x92
DBH001A

REP.	NB	DESIGNATION
J?	1	GAINE THERMO. NOIR Ø3,2 x 10

Creation for PENTRA-80.	CTH	ADC	01/12/01	5304	A
Description	Chk	By	Date	ECO	Rev

Designation: WASTE LEVEL DETECTION HARNESS
PENTRA 80
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
N° : XBA488A Sheet: S Drw size: A4 Scale: - Dim. in millimetres

DIAGNOSTICS

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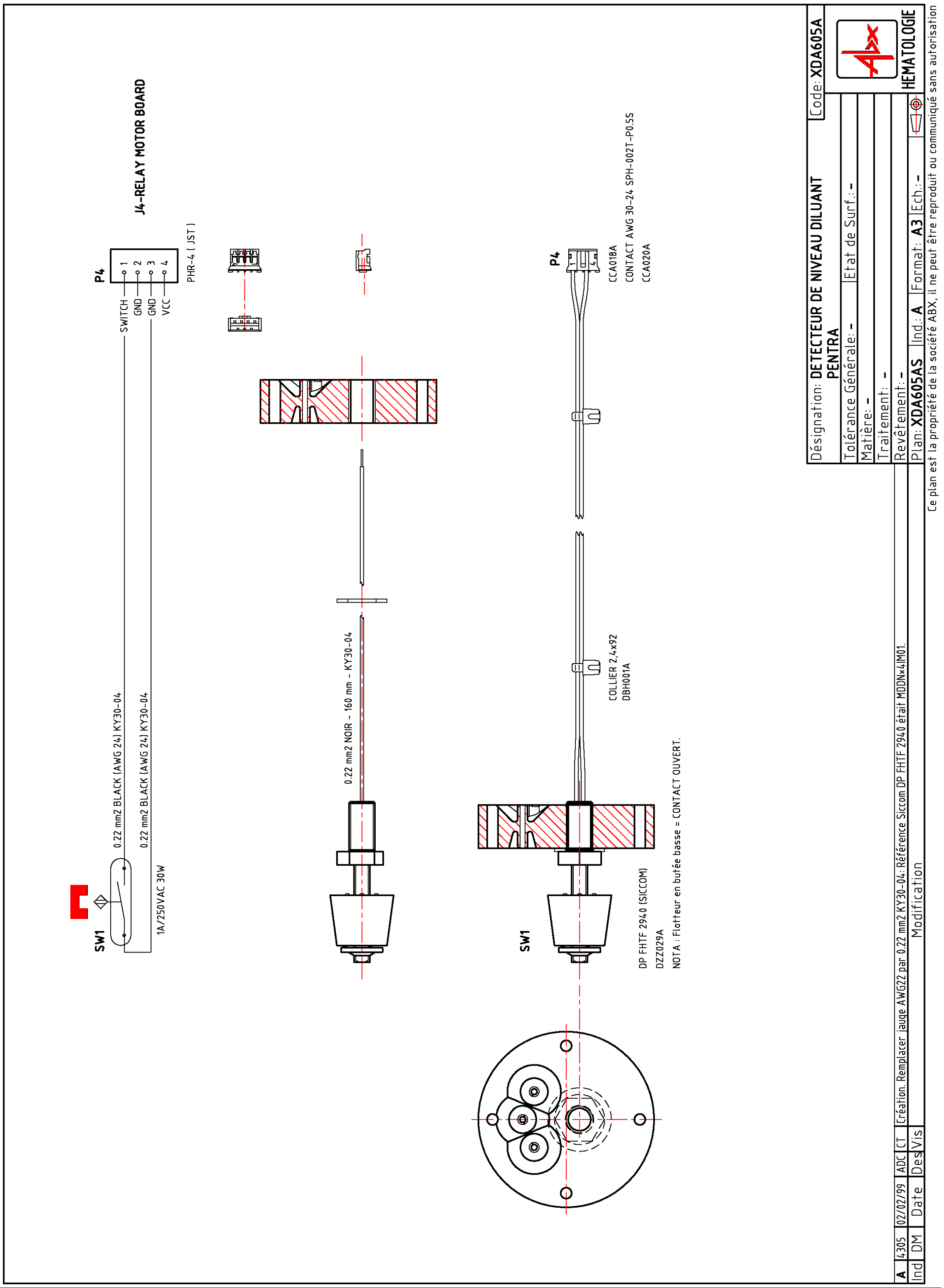
Diag.47:XBA488A Waste level detection

3.46. XDA605A Diluent reservoir with level detection


J4-RELAY MOTOR BOARD
P4
1 SWITCH
2 GND
3 GND
4 VCC
PHR-4 (JST)
SW1
0.22 mm2 BLACK (AWG 24) KY30-04
0.22 mm2 BLACK (AWG 24) KY30-04
1A/250VAC 30W
0.22 mm2 NOIR - 160 mm - KY30-04
P4
CCA018A
CONTACT AWG 30-24 SPH-002T-P0.5S
CCA020A
COLLIER 2,4x92
DBH001A
SW1
DP FHTF 2940 (SICCOM)
DZZ029A
NOTA : Flotteur en butée basse = CONTACT OUVERT.
Désignation: DETECTEUR DE NIVEAU DILUANT PENTRA
Code: XDA605A
Tolérance Générale: -
Etat de Surf.: -
Matière: -
Traitement: -
Revêtement: -
Plan: XDA605AS
Ind.: A
Format: A3
Ech.: -
HEMATOLOGIE
A 4305 02/02/99 ADC CT Création. Remplacer jauge AWG22 par 0.22 mm2 KY30-04: Référence Siccom DP FHTF 2940 était MDDNx4M01.
Ind DM Date Des Vis Modification
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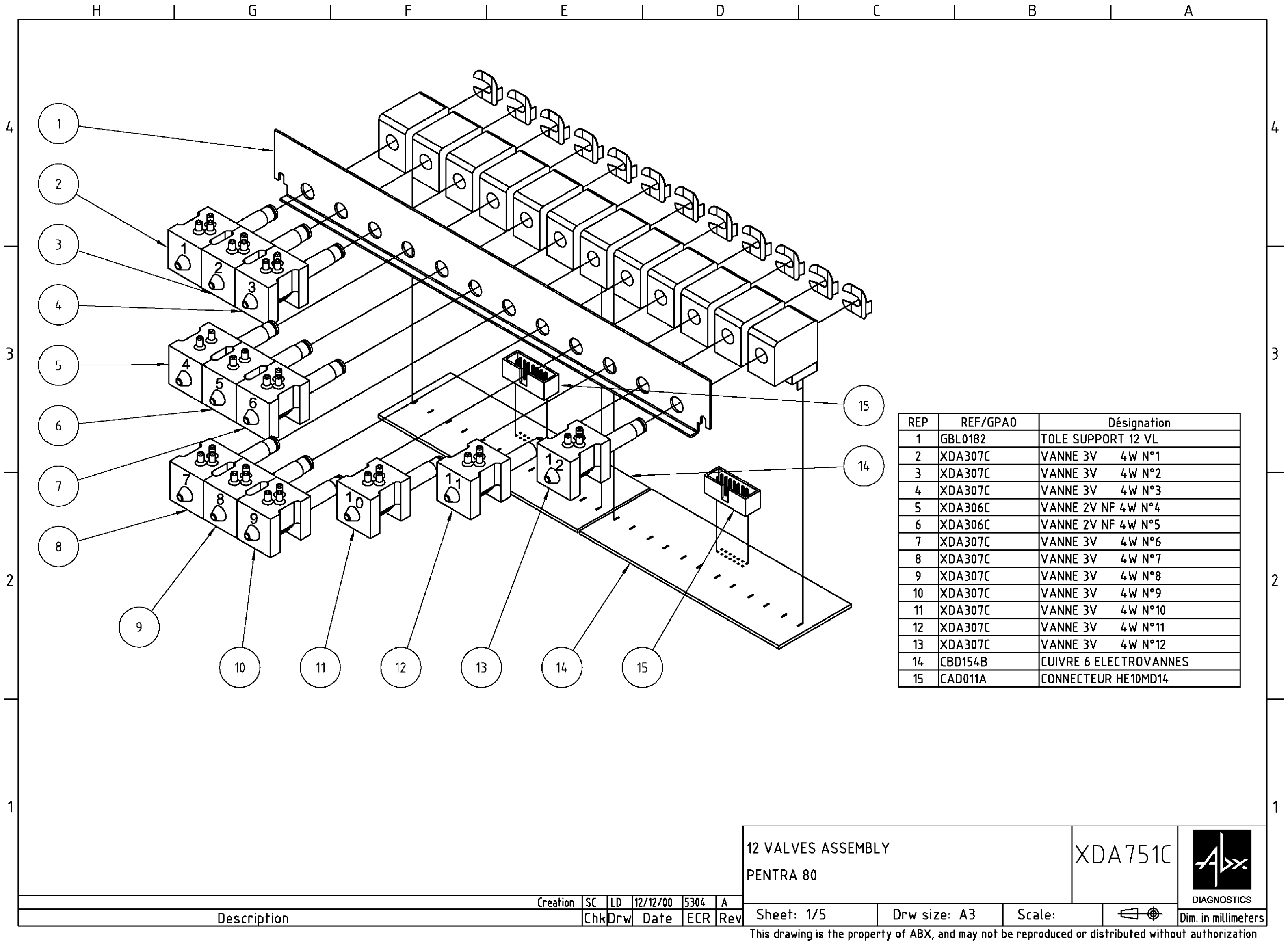
Diag.48:XDA605A Diluent reservoir with level detection

3.47. XDA751C 12 valves assy (LV1-6 & LV7-12)



REP	REF/GPAO	Désignation
1	GBL0182	TOLE SUPPORT 12 VL
2	XDA307C	VANNE 3V 4W N°1
3	XDA307C	VANNE 3V 4W N°2
4	XDA307C	VANNE 3V 4W N°3
5	XDA306C	VANNE 2V NF 4W N°4
6	XDA306C	VANNE 2V NF 4W N°5
7	XDA307C	VANNE 3V 4W N°6
8	XDA307C	VANNE 3V 4W N°7
9	XDA307C	VANNE 3V 4W N°8
10	XDA307C	VANNE 3V 4W N°9
11	XDA307C	VANNE 3V 4W N°10
12	XDA307C	VANNE 3V 4W N°11
13	XDA307C	VANNE 3V 4W N°12
14	CBD154B	CUIVRE 6 ELECTROVANNES
15	CAD011A	CONNECTEUR HE10MD14

H
G
F
E
D
C
B
A
4
3
2
1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
12 VALVES ASSEMBLY
PENTRA 80
XDA751C
DIAGNOSTICS
Creation
SC
LD
12/12/00
5304
A
Description
Chk
Drw
Date
ECR
Rev
Sheet: 1/5
Drw size: A3
Scale:
Dim. in millimeters
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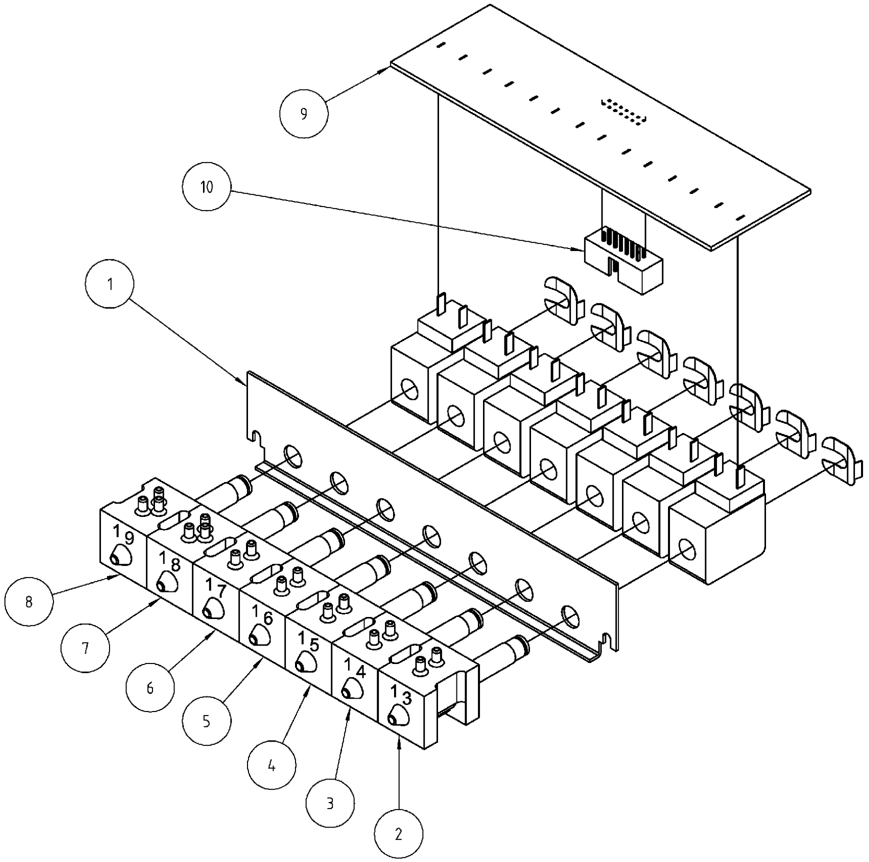
Diag.49:XDA751C 12 valves assy (LV1-6 & LV7-12)

3.48. XDA752C 7 valves assy (LV13-19)



REP	REF/GPAO	Désignation
1	GBG074A	TOLE SUPPORT 7 VL
2	XDA306C	VANNE 2V NF 4W N°13
3	XDA306C	VANNE 2V NF 4W N°14
4	XDA306C	VANNE 2V NF 4W N°15
5	XDA306C	VANNE 2V NF 4W N°16
6	XDA306C	VANNE 2V NF 4W N°17
7	XDA307C	VANNE 3V 4W N°18
8	XDA307C	VANNE 3V 4W N°19
9	CBD153A	CUIVRE 7 ELECTROVANNES
10	CAD025A	CONNECTEUR HE10MD14 UL + EXTRACTEUR LONG

NOTA : Référence du connecteur CAD025A
- Harting : 0918.514.6904
- 3M : 3314-6302
- Berg : 71918-114

Creation	SC	LD	12/12/00	5304	A
Description	Chk	Drw	Date	ECR	Rev

7 VALVES ASSEMBLY (SYRINGES SIDE)
PENTRA 80

XDA752C

ABX DIAGNOSTICS

Sheet: 2/5 Drw size: A3 Scale:

Dim. in millimeters

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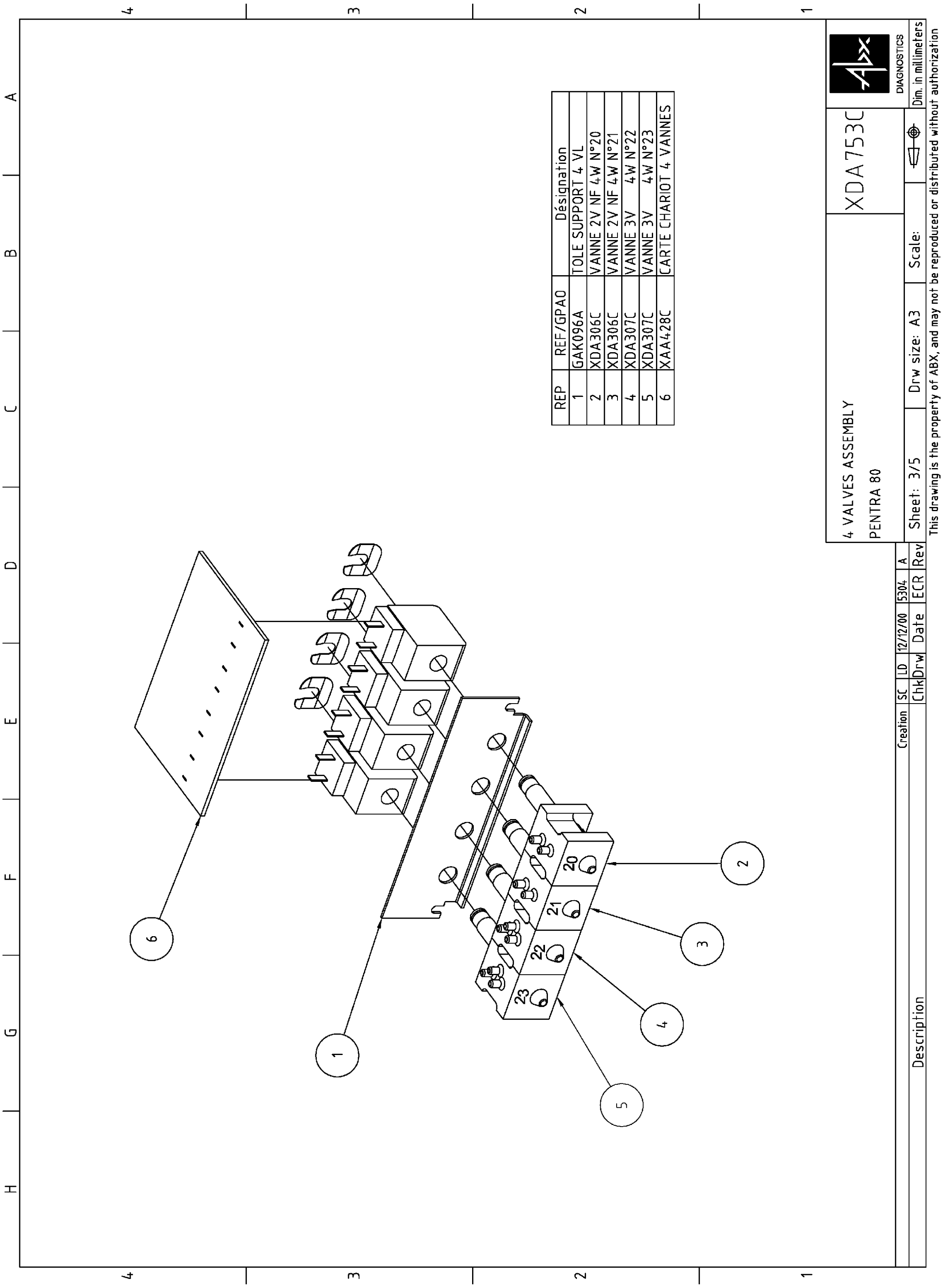
Diag.50:XDA752C 7 valves assy (LV13-19)

3.49. XDA753C Carriage valves assy (LV20-23)

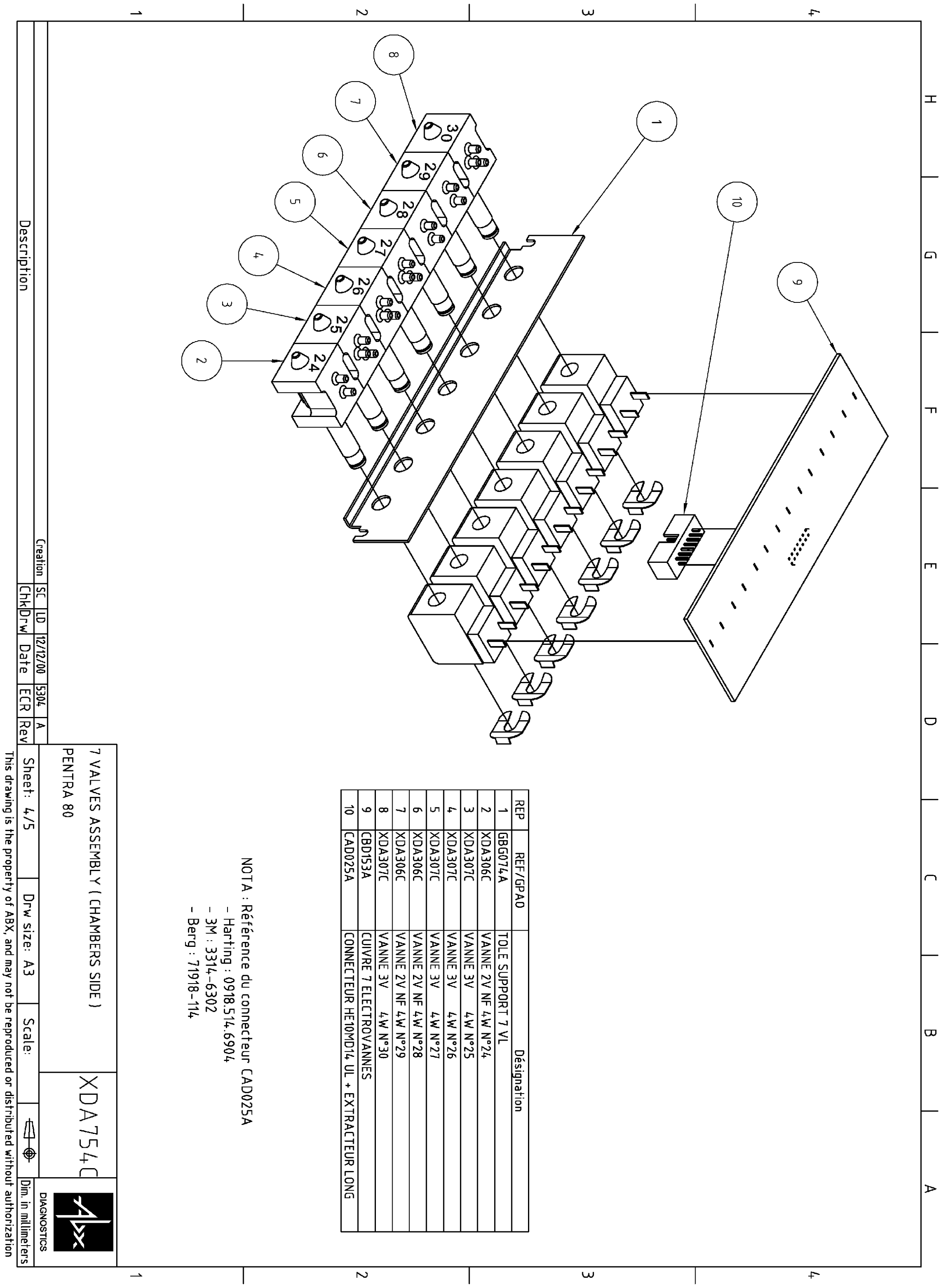


REP	REF/GPAO	Désignation
1	GAK096A	TOLE SUPPORT 4 VL
2	XDA306C	VANNE 2V NF 4W N°20
3	XDA306C	VANNE 2V NF 4W N°21
4	XDA307C	VANNE 3V 4W N°22
5	XDA307C	VANNE 3V 4W N°23
6	XAA428C	CARTE CHARIOT 4 VANNES

4 VALVES ASSEMBLY
PENTRA 80
XDA753C
DIAGNOSTICS
Sheet: 3/5
Drw size: A3
Scale:
Dim. in millimeters
This drawing is the property of ABX, and may not be reproduced or distributed without authorization
Creation SC LD 12/12/00 5304 A
Chk Drw Date ECR Rev
Description
1
2
3
4
5
6
20
21
22
23
A
B
C
D
E
F
G
H

Diag.51:XDA753C Carriage valves assy (LV20-23)

3.50. XDA754C 7 valves assy (LV24-30)



REP	REF/GPAO	Désignation
1	GBG074A	TOLE SUPPORT 7 VL
2	XDA306C	VANNE 2V NF 4W N°24
3	XDA307C	VANNE 3V 4W N°25
4	XDA307C	VANNE 3V 4W N°26
5	XDA307C	VANNE 3V 4W N°27
6	XDA306C	VANNE 2V NF 4W N°28
7	XDA306C	VANNE 2V NF 4W N°29
8	XDA307C	VANNE 3V 4W N°30
9	CBD153A	CUIVRE 7 ELECTROVANNES
10	CAD025A	CONNECTEUR HE10MD14 UL + EXTRACTEUR LONG

NOTA : Référence du connecteur CAD025A
- Harting : 0918.514.6904
- 3M : 3314-6302
- Berg : 71918-114

Creation	SC	LD	12/12/00	5304	A
	Chk	Drw	Date	ECR	Rev

7 VALVES ASSEMBLY (CHAMBERS SIDE)
PENTRA 80
XDA754C
Sheet: 4/5
Drw size: A3
Scale:
Dim. in millimeters

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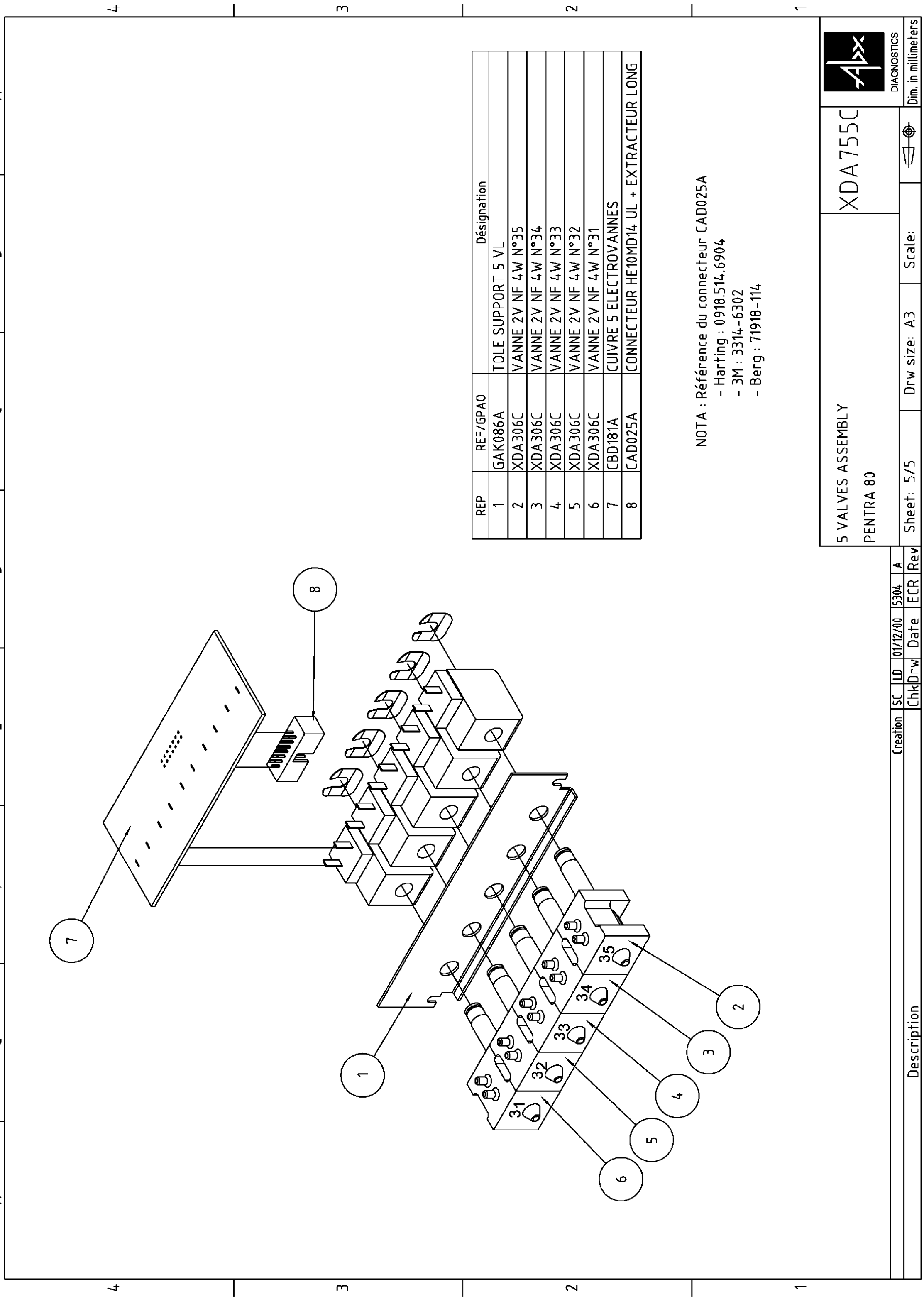
Diag.52: XDA754C 7 valves assy (LV24-30)

3.51. XDA755C 5 valves assy (LV31-35)



REP	REF/GPAO	Désignation
1	GAK086A	TOLE SUPPORT 5 VL
2	XDA306C	VANNE 2V NF 4W N°35
3	XDA306C	VANNE 2V NF 4W N°34
4	XDA306C	VANNE 2V NF 4W N°33
5	XDA306C	VANNE 2V NF 4W N°32
6	XDA306C	VANNE 2V NF 4W N°31
7	CBD181A	CUIVRE 5 ELECTROVANNES
8	CAD025A	CONNECTEUR HE10MD14 UL + EXTRACTEUR LONG

NOTA : Référence du connecteur CAD025A
- Harting : 0918.514.6904
- 3M : 3314-6302
- Berg : 71918-114

5 VALVES ASSEMBLY
PENTRA 80
XDA755C
Sheet: 5/5
Drw size: A3
Scale:
DIAGNOSTICS
Dim. in millimeters
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Description	Chk	Drw	Date	ECR	Rev
Creation	SC	LD	01/12/00	5304	A

Diag.53:XDA755C 5 valves assy (LV31-35)

4. Pentra 80 synoptic

See synoptic diagram on next page.

Analysis cycle technology

1. Analysis cycle description (Principles) 4-2

2. Measuring principles 4-4

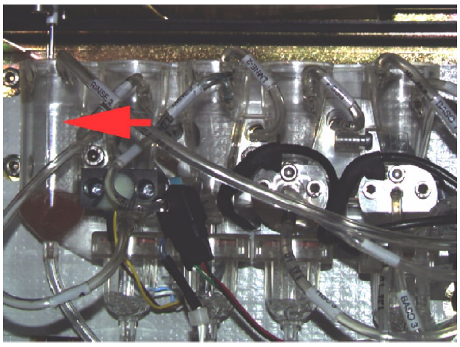
    2.1. Multi distribution sytem (MDSS) 4-4
    2.2. CBC detection principles 4-5
    2.3. WBC and differential count 4-7

1. Analysis cycle description (Principles)

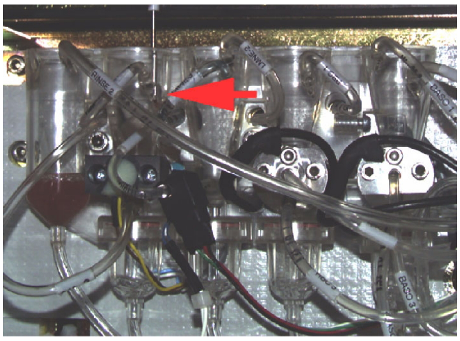
- Aspiration of blood sample from the tube trough the cap (53µl)
- Translation of sampling carriage over Rinse chamber.

Cleaning of the needles:

- Internal cleaning: 1ml inside piercing needle
- External cleaning: 2ml outside piercing needle
- Internal cleaning: 1ml inside piercing needle and reject of 3µl of blood (not used).

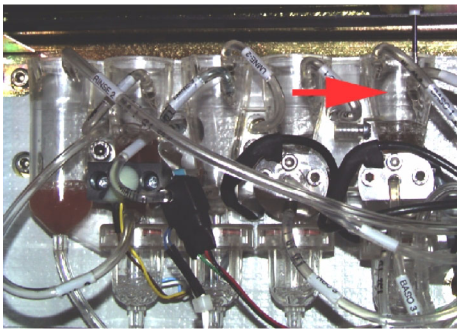


- Translation of sampling carriage DIL1 chamber (first dilution), descent of the needle.
- Positioning the needle point into a tangential flux of **ABX diluent** (1.65ml) and synchronised distribution of 10µl of blood.



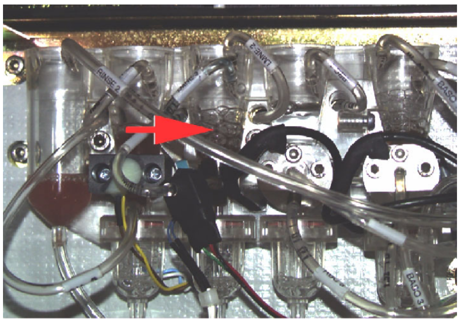
- Translation of sampling carriage over WBC/ BASO count chamber.
- Positioning the needle point into a tangential flux of 2ml of **ABX BASOLYSE II** and synchronised distribution of 10µl of blood.

Dilution
Blood Volume: 10 µl
BASOLYSE II Volume: 2000 µl
Dilution Rate: 1/200

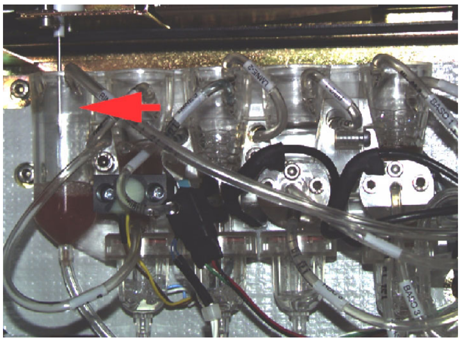


- Translation of sampling carriage over LMNE mixing chamber.
- Positioning the needle point into a tangential flux of 1ml of **ABX Eosinofix** and synchronised distribution of 25µl of blood.

Dilution
Blood Volume: 25 µl
Eosinofix Volume: 1000 µl
Diluent Volume: 1000 µl
Final Dilution Rate: 1/80

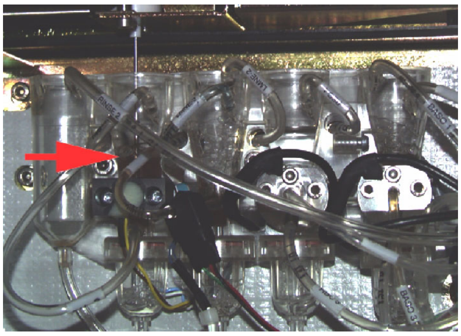


- Translation of sampling carriage over Rinse chamber
- Rinsing of the needles:
- Internal rinsing: 0.8ml inside sampling needle
- External rinsing: 0.5ml outside sampling needle
- Internal rinsing: 0.5ml inside sampling needle
- External rinsing: 0.3ml outside sampling needle

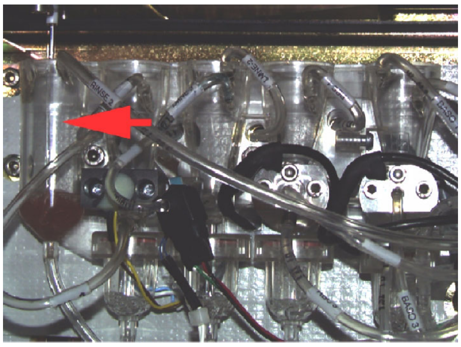


WBC and LMNE counting:
- 1ml of diluent into LMNE chamber
- Dilution transfer trough LMNE flowcell and counting during 12 seconds
- WBC\BASO counting

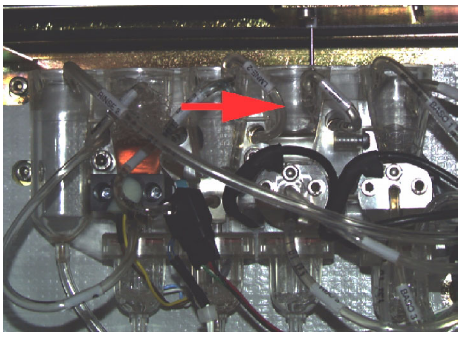
- Translation of sampling carriage over DIL1 chamber
- Sample of the 42.5µl of the first dilution.



- Translation of sampling carriage over Rinse chamber.
- Rinsing of the exterior of sampling needle with 0.4ml of diluent



- Translation of sampling carriage over RBC and PLT count chamber.
- Distribution of the 42.5µl of first dilution into a flux of 2.20ml of diluent.
- Distribution of 0.3ml of diluent from the interior of the needle.



Dilution
Initial Blood Volume: 10 µl
Reagent Volume (RBC chamber): 2500 µl
Final Dilution Rate: 1/10000
Hgb:
- Distribution of 0.36ml of ABX ALPHALYSE into DIL1 chamber while bubbling.
- WBC\BASO chamber rinsing:
- Draining and filling with 1ml of ABX CLEANER and 1.5ml of diluent
- RBC\Plt counting and Hgb measurement
- Chambers cleaning and Hgb blank
- Draining and filling of DIL1 chamber with 2.7ml of diluent
- Measurement of Hgb blank
- Flowcell rinsing (about 1.6ml of diluent)
- Draining and filling of RBC chamber with 2.5ml of diluent

2. Measuring principles

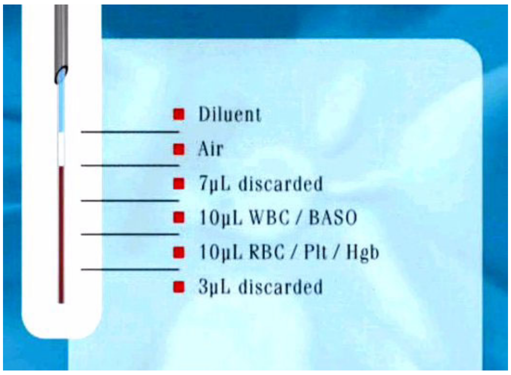
2.1. Multi distribution sytem (MDSS)

2.1.1. CBC mode

In CBC mode, 30µl of whole blood is aspirated then delivered with reagents into chambers as follows:

one specimen for the first RBC/Plt dilution and the Hgb measurement.

another specimen for the BASO/WBC count.


Diluent
Air
7µL discarded
10µL WBC / BASO
10µL RBC / Plt / Hgb
3µL discarded

Diag.1:Specimen distribution in CBC mode

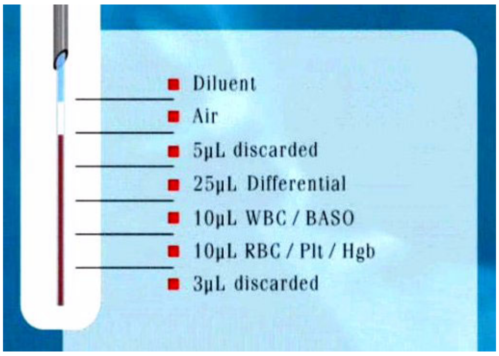
2.1.2. Diff Mode

In DIFF mode, 53µl of whole blood is aspirated, then delivered with reagents into chambers as follows:

one specimen for the first RBC/Plt dilution and the Hgb measurement.

another specimen for the BASO/WBC count.

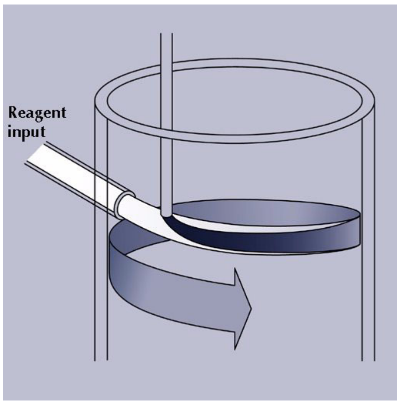
the last specimen for the LMNE matrix.


Diluent
Air
5µL discarded
25µL Differential
10µL WBC / BASO
10µL RBC / Plt / Hgb
3µL discarded

Diag.2:Specimen distribution in DIFF mode

2.1.3. Specimen distribution

Specimen distribution in the chambers is carried out in a tangential flow of reagent which allows perfect mixing of the dilution and avoids any viscosity problems (this multi distribution in a reagent flow is an ***ABX DIAGNOSTICS*** patent).


Reagent input

Diag.3:Blood distribution in a tangential flow

2.2. CBC detection principles

2.2.1. RBC/Plt

Measurement of impedance variation generated by the passage of cells through a calibrated micro aperture.

The specimen is diluted in an electrolytic diluent (current conductor) and pulled through the calibrated micro-aperture. Two electrodes are placed on either side of the aperture. Electric current passes through the electrodes continuously.

When the cell passes through the aperture, electric resistance between the two electrodes increases proportionately with the cell volume.

The generated impulses have a very low voltage, which the amplification circuit increases, so that the electronic system can analyze them and eliminate the background noise.

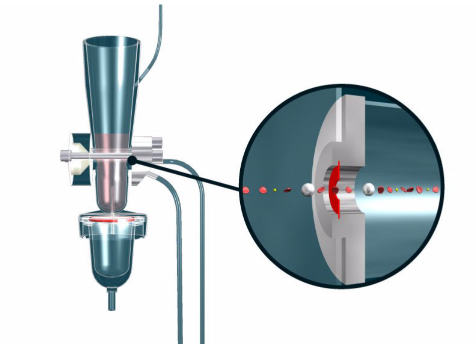
Results

Number of cells counted per volume unit x calibration coefficient

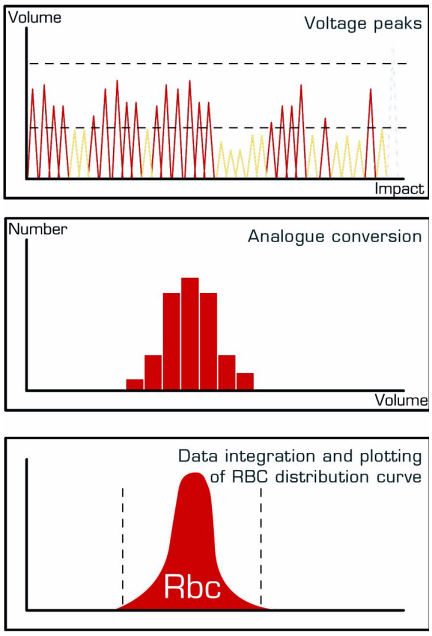
Histograms

RBC: Distribution curves on 256 counting channels from 30fl to 300fl.

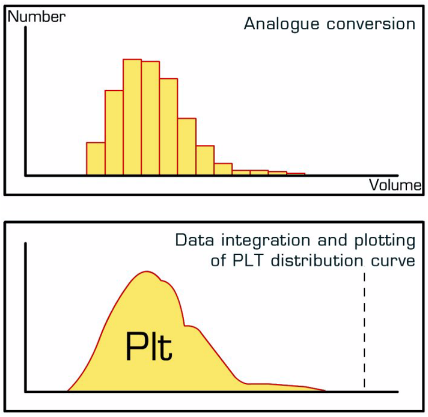
Plt: Distribution curves on 256 channels from 2fl to a mobile threshold. This threshold moves according to the microcyte population present in the analysis area.



Diag.4:Impedance Principles


Volume
Voltage peaks
Impact
Number
Analogue conversion
Volume
Data integration and plotting of RBC distribution curve
Rbc

Diag.5:RBC distribution curve


Number
Analogue conversion
Volume
Data integration and plotting of PLT distribution curve
Plt

Diag.6:Plt Distribution curve

Dilutions

Table 1: RBC\Plt dilutions

Technical characteristics of the RED BLOOD CELL and PLATELET counts			
Initial blood volume	10 µl	Method	Impedance
Vol. ABX DILUENT	2500 µl	Aperture diameter	50 µm

Table 1: RBC\Plt dilutions

Technical characteristics of the RED BLOOD CELL and PLATELET counts			
Final dilution rate**	1/10000	Count vacuum	200 mb
Temperature of reaction	35°C	Count period	2 X 6 seconds

**: Two successive dilutions are carried out : Primary Dilution for RBC and Plt:			
Blood (µl)	10 µl		
Vol. ABX DILUENT	1700	dilution	1/170

Secondary Dilution RBC and Plt (from the primary dilution)			
Dilution (µl)	42,5 µl		
Vol. ABX DILUENT	2500	dilution	1/58,8
Final dilution: 1/170 x 1/58,8 = 1/10000			

2.2.2. Hgb Measurement

The hemoglobin released by the lysis of the red blood cells combines with the potassium cyanide to form the chromogenous cyanmethemoglobin compound. This compound is then measured through the optical part of the first dilution chamber using a spectrophotometric technique at a wavelength of 550 nm.

Table 2: Hgb measurement

Technical characteristics for the HGB MEASUREMENT			
Blood volume	10 µl	Method	Photometry
Vol. ABX DILUENT	1700 µl	Wavelength	550 nm
Vol. ABX ALPHALYSE	400 µl		
complement ABX DILUENT	400 µl		
Final dilution rate**	1/250		
Temperature of reaction	35°C		

Results

Final Hgb result represents: Absorbance value obtained x coefficient of calibration.

Hct Measurement

The height of the impulse generated by the passage of a cell through the micro-aperture is directly proportional to the volume of the analyzed RBC.

The hematocrit is measured as a function of the numeric integration of the MCV.

2.2.3. RDW calculation

The study of the RBC distribution detects erythrocyte anomalies linked to anisocytosis.

A Red Cell Distribution Width (RDW) will enable you to follow the evolution of the width of the curve in relation to the cell number and average volume.

RDW = (K X SD) / MCV

With:

- K = system constant
- SD = Determined standard deviation according to statistical studies on cell distribution.
- MCV = Mean Corpuscular Volume of erythrocytes

2.2.4. MCV, MCH, MCHC calculation

- MCV (Mean Cell Volume) is calculated directly from the RBC histogram.
- MCH (Mean Cell Hemoglobin) is calculated from the Hgb value and the RBC number.
- The mean hemoglobin weight in each RBC is given by the formula:

MCH (pg) = Hgb/RBC x 10

- MCHC (Mean Corpuscular Hemoglobin Contained) is calculated according to the Hgb and Hct values. Mean Hgb concentration in the total volume of RBC is given by the formula:

MCHC (g/dL) = Hgb/Hct x 100

2.2.5. MPV Measurement

The MPV (Mean Platelet Volume) is directly derived from the analysis of the platelet distribution curve.

2.2.6. Pct Calculation

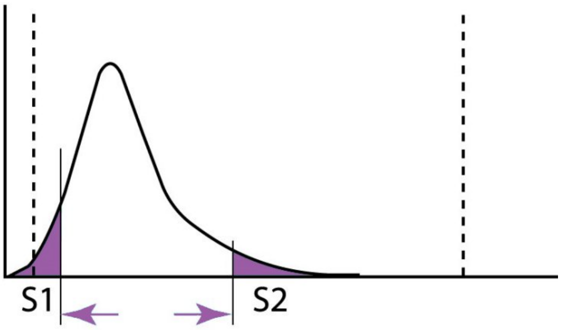
Thrombocrit is calculated according to the formula:

Pct% = Plt (103/µl) x MPV (µm3) / 10 000

2.2.7. PDW calculation

PDW (Platelet Distribution Width) is calculated from the Plt histogram.

The PDW is represented by the width of the curve between 15% of the number of platelets starting from 2 fl (S1), and 15% of the number of platelets beginning with the variable top threshold (S2).



Diag.7:PDW calculation

2.3. WBC and differential count

2.3.1. General principles

The WBC count is carried out twice by two different sensors:

- In the BASO count chamber at the same time as the BASOS count,
- In the optical chamber during the acquisition of the LMNE matrix.

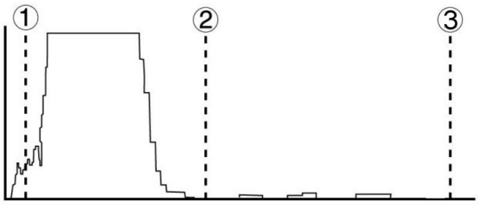
The reference count is the one obtained in the WBC and BASO count chamber.

2.3.2. BASO/WBC Count

Detection principle is the same as for RBC.

Differentiation betwen BASOs and other leukocytes is obtained by means of the ***BASOLYSE II*** specific lysing action.

All the WBCs are counted between the electrical threshold <0> threshold <BA3>. The basophils are located from threshold <BA2> to threshold <BA3>.



Diag.8:WBC/BASO histogram

Table 3: WBC\Baso count

Technical characteristics of the WBC/BASO counts			
Initial blood volume	10 µl (CBC or CBC/DIFF)	Method	Impedance
Vol. ABX BASOLYSE II	2000 µl	Aperture diameter	80 µm
Final dilution rate**	1/200	Count vacuum	200 mb
Temperature of reaction	35°C	Count period	2 X 6 seconds

Results

WBC: Number of cells per volume x coefficient of calibration.

BASO: Number of cells per volume x coefficient of calibration in percentage regarding the total number of leukocytes (BASO + WBC nuclei).

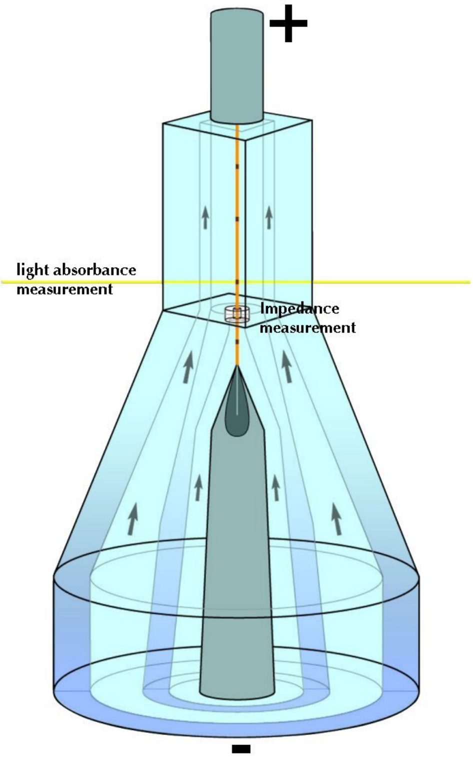
2.3.3. LMNE Matrix

The WBC and Differential count are based on 3 essential principles:

- The double hydrodynamic sleeving «DHSS» (***ABX DIAGNOSTICS*** patent)
- The volume measurement (*impedance changes*).
- The measurement of transmitted light with 0° angle, which permits a response according to the internal structure of each element and its absorbance by means of incident light diffusion.

25µl of whole blood is delivered to the LMNE chamber in a flow of EOSINOFIX. This reagent lyses the RBC, stabilizes the WBC in their native forms and stains the eosinophil nuclei with a specific coloration.

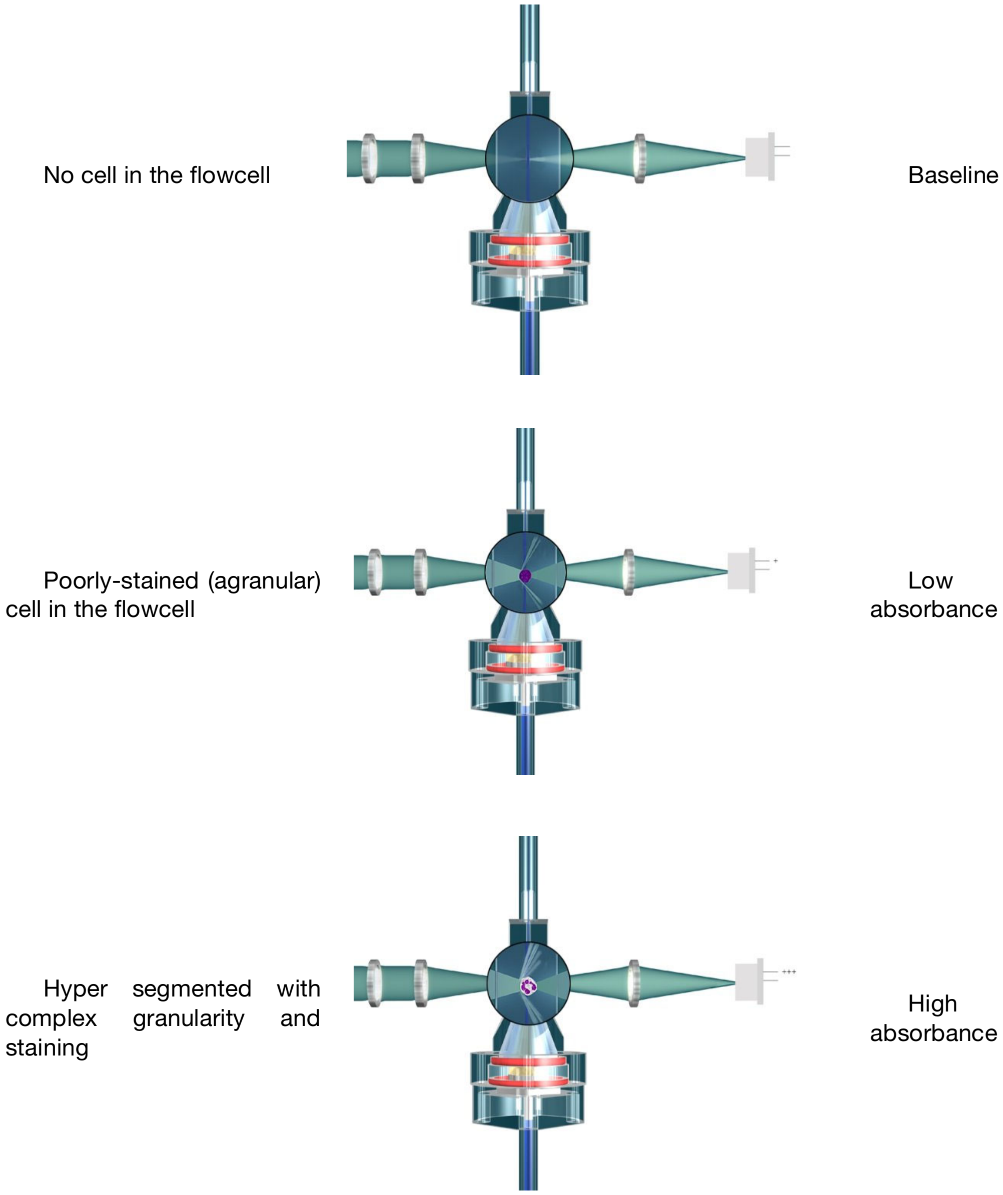
The solution is then stabilized with diluent and transferred to the measuring chamber. Each cell is measured both in absorbance (cytochemistry) and resistivity (volume).



Diag.9:DHSS principles

Table 4: WBC counts

Technical characteristics of the WBC counts during the acquisition of the matrix			
Initial blood volume	25 µl	Method	Impedance with hydrofocus
Vol. ABX Eosinofix	1000 µl	Aperture diameter	60 µm
Diluent Volume	1000 µl	Flow diameter	42 µm
Final dilution rate	1/80	Injection duration	12 s
Temperature of reaction	35°C	Volume injected	72µl
Incubation duration	12s		


No cell in the flowcell
Baseline
Poorly-stained (agranular) cell in the flowcell
Low absorbance
Hyper segmented with complex granularity and staining
High absorbance

Diag.10:Absorbance measurement

Results

From these measurements, a matrix is drawn up with volumes on the X-axis and optical transmission on the Y-axis. The study of the matrix image permits the clear differentiation of 4 out of 5 leukocyte populations. As a matter of fact, the basophil population is very small compared to the others.

MONOCYTES: The monocytes, being cells with large kidney shaped nuclei and a large non-granular cytoplasm, will neither be scattered nor absorb a large amount of light. They will therefore be positioned in the lower part of the optical axis but clearly to the right of the volume axis.

LYMPHOCYTES: The lymphocytes being small with regular shape, are positioned in the lower part of both the optical axis and volume axis. Normal lymphocyte populations are generally observed with a good volume homogeneity. The far left side of the lymphocyte zone should normally be empty, but when small lymphocytes are present, population may exist in this area. The presence of platelet aggregates is detected by a distribution pattern that moves from the origin of the matrix (background zone) into the lymphocyte zone. The NRBCs with their cytoplasmic membranes lysed like the erythrocytes, will have their nuclei situated to the far left side of the lymphocyte zone.

EOSINOPHILS: With reagent action on cytoplasmic membranes, the leukocytes keep their native size and only eosinophils are colored for optical separation. Eosinophils will be situated in the upper part of the optical Y-axis due to their strong absorbance qualities and their size, which is nearly equivalent to large neutrophils.

NEUTROPHILS: The neutrophils, with their cytoplasmic granules and their generally segmented nuclei, will scatter light depending on their morphological complexity. A hypersegmented neutrophil will give an increased optical response with respect to a young neutrophil population which will be in the upper position of the optical axis depending on the presence of segmentation and/or granules.

Additional parameters: LIC (Large Immature Cells) and ALY (Atypical Lymphocytes) complete the panel available on the matrix.

The immature granulocytic cells are detected by their larger volumes and by the presence of granules which increase the intensity of the scattered light. Therefore, cells such as metamyelocytes will be found clearly to the right of the neutrophils and nearly at the same level. Myelocytes and promyelocytes will be found in saturation position on the far right of the matrix. These last three populations will be counted as LIC (Large Immature Cells) and their given results are included in the neutrophil value. The blast cells will be found generally to the right of the monocytes, and, as such, will increase the LIC count. Small blasts will be found between the normal lymphocytes and monocytes. Platelets and debris from erythrocyte lysis represent the background noise population located in the lower left area of the matrix. Most of the population partition thresholds are fixed and give the limits of the morphological normality of leukocytes. Changes in the morphology of a population will be expressed on the matrix by a shifting of the corresponding population.

A Blast alarm is generated from increased counts within the LIC area, this is correlated with Blast detection on the Basophil curve.

Large lymphocytes are detected in the ALY (Atypical Lymphocytes) zone, where reactive lymphoid forms, stimulated lymphocytes and plasmocytes are also to be found.

Software release

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   - 1.2. Miniclean 5-3
   - 1.3. Autoclean... 5-3
   - 1.4. Technician Menu 5-3

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   - 2.1. Software releases table.. 5-4
   - 2.2. Software modification.. 5-4

1. Service software overview

1.1. Super User Menu

- Mechanical
- Hydraulic
- Others

1.1.1. Mechanical

- Initialisation
- Check Motors
- Check Valves
- Check Sensors
- Sampler test
- Holder Adjustment
- Rack Adjustment

1.1.2. Hydraulic

- Drain Chambers
- Prime Cycles
- Unprime Cycles
- Clean Cycles

1.1.3. Others

- Cycles Counter
- Run Park Syringes Position
- Run Maintenance Carriage Pos.

1.2. Miniclean

- Miniclean

1.3. Autoclean

- Autoclean

1.4. Technician Menu

- Measurement
- Gains
- Others

1.4.1. Measurement

- Gain Adjustment
- LMNE Adjustment
- Aperture Current
- Pulse Adjustment

1.4.2. Gains

- Thermic Adjustment
- M.D.S.S. Adjustment
- Liquid Sensor Adjustment
- Vacuum Control
- Sampler Adjust.
- Bubbling

1.4.3. Others

- LMNE Calibration
- Cycles
- Calibration Coefficients
- Blank Values
- System Tools
- Burn In Cycles

2. Software releases

2.1. Software releases table

INDEX	P/N REVISION	SOFTWARE REVISION	SECTION	DATE
A	RAH 919 AA	V1.01	ALL	31/03/02

2.2. Software modification

V1.01: First release of technical manual.

MDSS Technology pentra 80

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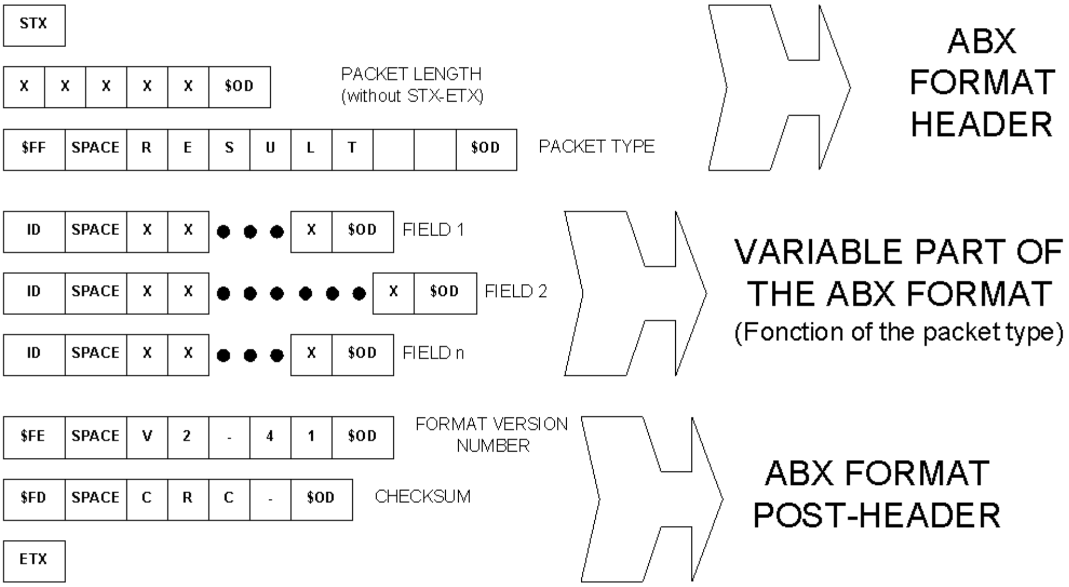
ABX HORIBA
DIAGNOSTICS

1. ABX format principles

1.1. Message structure

The ABX format can have a different number of fields according to the transmitted items setup by the user (results, curves, flags, etc...). The fields have the same characteristics than the ARGOS format. The result identifier is different according to the type of result: patient result ("RESULT"), re-run result (RES-RR), QC result (QC-RES) etc...

Example of "abx format":


STX
X X X X X $0D
PACKET LENGTH (without STX-ETX)
$FF SPACE R E S U L T $0D
PACKET TYPE
ABX FORMAT HEADER
ID SPACE X X ● ● ● X $0D
FIELD 1
ID SPACE X X ● ● ● ● ● ● X $0D
FIELD 2
ID SPACE X X ● ● ● X $0D
FIELD n
VARIABLE PART OF THE ABX FORMAT
(Fonction of the packet type)
$FE SPACE V 2 - 4 1 $0D
FORMAT VERSION NUMBER
$FD SPACE C R C - $0D
CHECKSUM
ETX
ABX FORMAT POST-HEADER

- STX
- Size + carriage return.
- Identifier followed by a Load Type + carriage return.
- Identifier followed by the Information associated to the Load Type + carriage return.
- Remainder of the other Identifiers and Informations associated to the Load Type + carriage returns.
- Other Load Type blocs + Associated Informations.

....

- Identifier followed by the CheckSum + carriage return.
- ETX

1.2. Details about the structure

Size: 5 bytes representing the total amount of the data except STX and ETX.

Load: An 8 character chain preceeded by a space indicating that this load is a result type.

Identifier: 1 byte (moving about $21 to $FF, it describes the information type which follows this indicator).

CheckSum: Sum modulo 65535 of all the characters except ETX, STX and all informations about checksum (identifier - space - checksum - carriage return) in the hexadecimal format on 4 bytes, preceeded by a space.

Strings of characters having a length smaller than the expected character number have to be completed on the right handside by "spaces".

1.3. Identifier list and their formats

1.3.1. Hematology numerical parameters

A- Format description
Numerical field:
For all indicated parameters from $21 to $43, the format is a numerical field of 5 digits completed with zeros on the left side (ex. : 04.55) and preceeded by a space.
The unit is the standard units (Version V2.2).
When the parameter cannot be calculated by the analyzer, the field is replaced with (--.--).

Parameter status:
Following the numerical field, a first digit gives the counting rejection status or the suspicion, a second one gives the parameter value status according to high and low normalities, to high and low extreme values and to the overloading capacities.

Table 1: Identifier First digit

First digit (letter)	Correspondance
R	Parameter rejected for a counting default
B	Incorrect balance between the counting methods
S	Suspicious parameter value
'space'	No anomaly observed

Table 2: Identifier Second digit

Second digit (letter)	Correspondance
L	Parameter < to the lower extreme value
l	Parameter < to the low normal value
'space'	Parameter normal value
h	Parameter > to the high normal value
H	Parameter > to the high extreme value
O	Parameter exceeding the capacity

Example:
5.5 millions RBC with a counting error in the standard units :
$32 $20 $30 $35 $2E $35 $30 $52 $68 $0D ou “2 05.50Rh” + carriage return.
The length is fixed and is worth 2+7+1, that is to say 10 bytes for one parameter.

1.3.2. Identifier list

Table 3: Identifier list

Identifiers		Parameters	Units
$21	!	WBC	Standard - SI g/dl - SI mmoles - (or others)
$22	«	Lymphocytes	(#)
$23	#		(%)
$24	$	Monocytes	(#)
$25	%		(%)
$26	&	Granulocytes	(#)

Table 3: Identifier list

Identifiers		Parameters	Units
$27	'		(%)
$28	(	Neutrophils	(#)
$29	)		(%)
$2A	*	Eosinophils	(#)
$2B	+		(%)
$2C	,	Basophils	(#)
$2D	-		(%)
$2E	.	Atypical Lymphocytes	(#)
$2F	/		(%)
$30	0	Large Immature Cells	(#)
$31	1		(%)
$32	2	RBC	Standard - SI g/dl - SI mmoles - (or others)
$33	3	Hgb	
$34	4	Hct	
$35	5	MCV	
$36	6	MCH	
$37	7	MCHC	
$38	8	RDW	
$39	9	reserved	
$3A	:	reserved	
$3B	;	Reticulocytes	(#)
$3C	<		(%)
$3D	=	Reticulocytes Low	(%)
$3E	>	Reticulocytes Median	(%)
$3F	?	Reticulocytes High	(%)
$40	@	PLT	Standard - SI g/dl - SI mmoles - (or others)
$41	A	MPV	
$42	B	THT	
$43	C	PDW	
$44	D	Reserved	
$45	E	Reserved	
$46	F	Reserved	
$47	G	Immatures	
$48	H	Mean fluorescent index	(%)
$49	I	Mean reticulocyte volume	Standard - SI g/dl - SI mmoles - (or others)
$4A	J	Corrected reticulocyte count	(%)
$4B	K	Creactive protein	(µg/ml)
$4C	L	IRF	

1.3.3. Parameter extended formats

No restriction on the lentgh for the fields #####. The first 12 parts are followed by the raw counts 1 and 2. For the LMNE channel, only the first 2 parts are initialized with the RA# and CO% values.

Table 4: Parameter extended formats

Identifiers		Parameters	Formats	Lengths
$90	É	WBC	No unit	1+[14 x ($20 #####) +1
$91	æ	RBC	No unit	1+[14 x ($20 #####) +1
$92	Æ	HGB	No unit	1+[14 x ($20 #####) +1
$93	ô	HCT	No unit	1+[14 x ($20 #####) +1
$94	ö	PLT	No unit	1+[14 x ($20 #####) +1
$95	ò	BASO	No unit	1+[14 x ($20 #####) +1
$96	û	LMNE	No unit	1+[14 x ($20 #####) +1

1.4. Pathology

1.4.1. Flags associated with parameters

Flags are transmitted in a comprehensive mode (same presentation than on the screen, that is to say dependant from the language), preceeded by a space. They are replaced with spaces when the flag has not been detected.

Table 5: Flags associated with parameters (English)

Identifiers		Parameters	Formats	Lengths
$50	P	WBC	L1M1M2G1G2G3	2 + 12 + 1
$51	Q	Differential	COMBLLNLMNLNRMRNN ONELBLI1	2 + 25 + 1
$52	R	RBC	MiMa	2 + 4 + 1
$53	S	Plt	PcScMc	2 + 6 + 1
$66	f	WBC balance	BASO or WBC1 or WBC2 and Lmne+/- and BASO+/-	2 + 14 + 1
$67	g	General	MpXbXr	2 + 6 + 1
$68	h	Reticulocytes	LowLasPitFitNrbc	2 + 16 + 1
$A2	I	RUOs	RUO message (*)	2 + 76 + 1

Table 6: Flags associated with parameters (French)

Identifiers		Parameters	Formats	Lengths
$50	P	GB	L1M1M2G1G2G3	2 + 12 + 1
$51	Q	Formule	COMBLLNLMNLNRMRNN ONELBLI1	2 + 25 + 1
$52	R	GR	MiMa	2 + 4 + 1
$53	S	Plaquettes	PcScMc	2 + 6 + 1
$66	f	Balance GB	BASO or GB1 or GB2 and Lmne+/- and BASO+/-	2 + 14 + 1
$67	g	Générales	MpXbXr	2 + 6 + 1
$68	h	Réticulocytes	LowLasPitFitNrbc	2 + 16 + 1
$A2	I	RUOs	message RUO (*)	2 + 76 + 1

The RUO message is a warning message, transmitted allways in english language. Its content and size depend on the instrument. IN USA AND CANADA, PCT, PDW, ALY AND LIC ARE FOR

RESEARCH USE ONLY.
- Pathologies for the differential are given in capital letters for the english language in order to avoid confusion between L1 and LL.
- Pathology for platelets "Pc" is given for small cells (Petites cellules in french) in order to avoid confusion with "Sc" (Schizocytes).

Example of flags on WBC balance:
- $66 $20 BASOLmne+BASO+ $0D
- $66 $20 WBC1 $20$20$20$20$20$20$20$20$20$20 $0D
- $66 $20 $20$20$20$20 Lmne- $20$20$20$20$20 $0D

1.4.2. Pathological messages

Each pathology is described by a group of 4 letters preceded by a space. The content of the pathology is dependent from the chosen language. Messages are divided in 3 groupes.

Only the detected pathologies are transmitted. A common header to the 3 groups indicates that the pathological interpretation has not been determined by the analyzer.

Table 7: Pathological format description (English)

Population	Messages	Signification
WBC	GRA+	Granulocytosis
	GRA-	Granulopenia
	LEU+	Leukocytosis
	LEU-	Leukopenia
	LYM+	Lymphocytosis
	LYM-	Lymphopenia
	NEU+	Neutrophilia
	NEU-	Neutropenia
	EOS+	Eosinophilia
	MYEL	Myelemia
	LIMC	Large Immature Cells
	ALYM	Atypic Lymphocytes
	LSHT	Left shift
	NRBC	Nucleated Red Blood Cells
	MON+	Monocytosis
	BAS+	Basophilia
	BLST	Blasts
RBC	ANEM	Anemia
	ANI1, ANI2, ANI3	Anisocytosis level 1, 2, 3
	MIC1, MIC2, MIC3	Microcytes level 1, 2, 3
	MAC1, MAC2, MAC3	Macrocytes level 1, 2, 3
	MICR	Microcytosis
	MACR	Macrocytosis
	HCR1, HCR2, HCR3	Hypochromia level 1, 2, 3
	CAGG	Cold agglutinin
	ERYT	Erythrocytosis
Plt	THR+	Thrombocytosis

Table 7: Pathological format description (English)

Population	Messages	Signification
	THR-	Thrombopenia
	PLAG	Platelet aggregates
	SCEL	Small cells
	MICC	Microcytes
	SCHI	Schizocytes
	MAPL	Macro platelet
Reticulocytes	IMMT	Immature reticulocytes
	RET+	Reticulocytosis
	RET-	Reticulopenia
All populations	????	No interpretation
	PANC	Pancytopenia

Table 8: Pathological format description (French)

Population	Messages	Signification
GB	GRA+	Granulocytose
	GRA-	Granulopenie
	LEU+	Leucocytose
	LEU-	Leucopénie
	LYM+	Lymphocytose
	LYM-	Lymphopénie
	NEU+	Neutrophilie
	NEU-	Neutropénie
	EOS+	Eosinophilie
	MYEL	Myélémie
	GCIM	Grandes Cellules Immatures
	LYAT	Atypic Lymphocytes
	FORG	Formule gauche
	ERYB	Erythroblastes
	MON+	Monocytose
	BAS+	Basophilie
	BLST	Blastes
GR	ANEM	Anémie
	ANI1, ANI2, ANI3	Anisocytose niveau 1, 2, 3
	MIC1, MIC2, MIC3	Microcytes niveau 1, 2, 3
	MAC1, MAC2, MAC3	Macrocytes niveau 1, 2, 3
	MICR	Microcytose
	MACR	Macrocytose
	HCR1, HCR2, HCR3	Hypochromie niveau 1, 2, 3
	AGGF	Agglutinine froide
	POLY	Erythrocytose

Table 8: Pathological format description (French)

Population	Messages	Signification
Pla	THR+	Thrombocytose
	THR-	Thrombopenie
	AGPL	Aggrégats plaquettaires
	PECL	Petits éléments cellulaires
	MICC	Microcytes
	SCHI	Schizocytes
	MAPL	Macro plaquettes
Réticulocytes	IMMT	Réticulocytes immatures
	RET+	Réticulocytose
	RET-	Réticulopénie
Toutes populations	????	Pas d’interprétation possible
	PANC	Pancytopénie

Table 9: Identifier list

Identifiers		Parameters	Formats	Lengths
$54	T	WBC	String of characters	1 + ..12 x 5.. + 1 (max)
$55	U	RBC	String of characters	1 + ..7 x 5.. + 1 (max)
$56	V	PLT	String of characters	1 + ..4 x 5.. + 1 (max)
$69	i	RET	String of characters	1 + ..2 x 5.. + 1 (max)

1.5. Histograms and matrix

1.5.1. Identifier list

Table 10: Histogram & Matrix format description

Identifiers		Parameter	Format	Length
$57	W	WBC	Amplitude of each channel	2 + 128 + 1
$58	X	RBC	Amplitude of each channel	2 + 128 + 1
$59	Y	Plt	Amplitude of each channel	2 + 128 + 1
$5A	Z	Basophils	Amplitude of each channel	2 + 128 + 1
$5B	[	Lmne matrix	Screen bitmap	2 + 4096 +1
$5C	\	Reticulocyte matrix	Screen bitmap	2 + 4096 +1
$5D	]	WBC thresholds	5 thresholds	1 + 20 + 1
$5E	^	RBC thresholds	2 thresholds	1 + 8 + 1
$5F	_	PLT thresholds	1 threshold	1 + 4 + 1
$60	‘	Basophil thresholds	3 thresholds	1 + 12 + 1
$61	a	Lmne matrix thresholds	12 RES thresholds, 6 ABS thresholds (3 of them give the proximity flags : FLN, FMN, FNE)	1 + 72 + 1
$62	b	Reticulocyte matrix thresholds	4 CIS thresholds, 4 OFL thresholds	1 + 32 + 1

Table 10: Histogram & Matrix format description

Identifiers		Parameter	Format	Length
$63	c	Double matrix Lmne	screen bitmap	2 + 8192 + 1
$64	d	Lmne matrix	extended format	see description
$65	e	Reticulocyte matrix	extended format	see description
$6C	l	WBC	extended format	see description
$6D	m	RBC	extended format	see description
$6E	n	PLT	extended format	see description
$6F	o	BASO	extended format	see description

1.5.2. Format description

A. Histograms

Histograms are transmitted on 128 channels, preceeded by a space. They are automaticaly rescaled to a 223 maximum amplitude value. The zero amplitude value is $20, the maximum amplitude value is $FF.

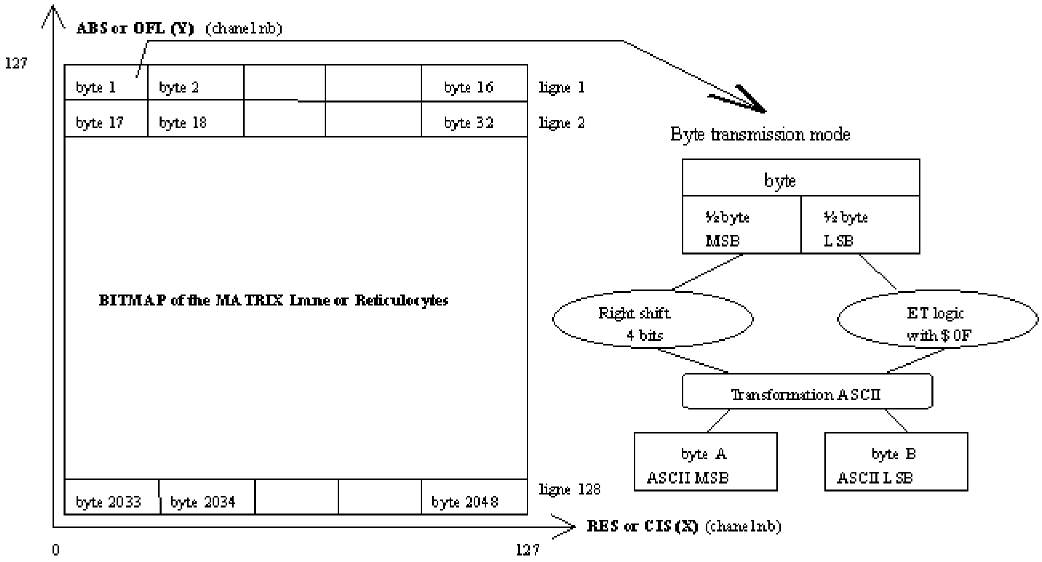
B. Extended format

The extended format includes all the heigth informations relative to each chanel. It is constituted by a chart of 256 [RES] entries of 16 bytes each. These 512K chart is encoded before being transmitted. The format is as follow : identificator, space, encoding type on 8 characters (od or uuencode), space, encoded data size on 5 characters, space, data then carriage return.

Exemple: $6C $20 uuencode $20 00724 $20 data $0D

C. Matrix

SCREEN BITMAP: 2048 graphic bytes matrix are transmitted on 4096 ASCII bytes, preceeded by a space. Each group of 2 ASCII bytes is the value of 1 graphic byte represented from the left to the right and from the top to the bottom of the screen (principles of the recovery of the 128x16 matrix bitmap on the PENTRA 120 LCD board). The double matrix [127 (ABS) x 256 (RES)] is transmitted according to the same procedure.


ABS or OFL (Y) (chanel nb)
127
byte 1
byte 2
byte 16
ligne 1
byte 17
byte 18
byte 32
ligne 2
BITMAP of the MATRIX Lmne or Reticulocytes
byte 2033
byte 2034
byte 2048
ligne 128
0
127
RES or CIS (X) (chanel nb)
Byte transmission mode
byte
½ byte MSB
½ byte LSB
Right shift 4 bits
ET logic with $ 0F
Transformation ASCII
byte A ASCII MSB
byte B ASCII LSB

EXTENDED MODE FORMAT (3D curve): The extended format includes all the heigth informations relative to each chanel. It is constituted by a chart of 128 [ABS] x 128 [RES], 128 [ABS] x 256 [RES] or 256 [OFL] x 128 [CIS] entries of 16 bytes each. These 32K or 64K charts are first of all compressed (3k approximately for a 32K chart) then encoded (expansion 1 to 2) before being transmitted. The format is as follow : identificator, space, compression algorythm on 8 characters ("squeeze"), space, encoding type on 8 characters (uuencode), chart format on 8 characters, space, encoded data size on 5 characters, space, data then carriage return.

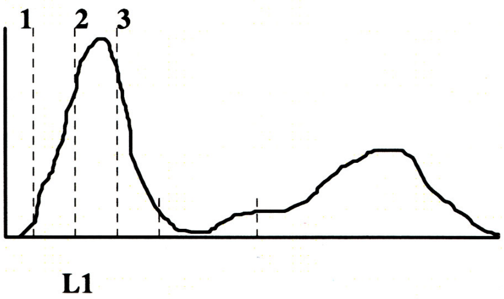
EXAMPLES:

$64 $20 lha$20$20$20$20$20 $20 od$20$20$20$20$20$20 $20 128Y256X $20 10772 $20 data $0D
$65 $20 compress $20 uuencode $20128X128Y $20 05386 $20 data $0D

D. Separation thresholds
It is the channel number (decimal value) enclosing areas on the histograms or on the matrix.
Each threshold is transmitted on 3 bytes preceeded by a space.

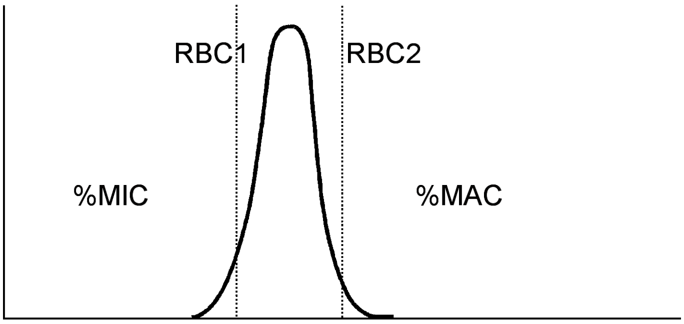
1.5.3. Format description of the threshold transmission

A. WBC identifier
Separation thresholds 1-2-3 allow the L1 flag determination (See Diag.1:“L1 flag determination”, page 10).
Example: output format of the WBC curve thresholds for CBC and DIFF sampling.
“] 005 008 020 000 000” + carriage return.



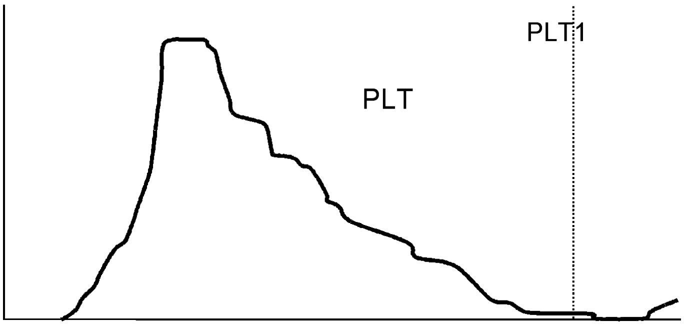
Diag.1:L1 flag determination

B. RBC identifier
Separation thresholds 1-2 allow the calculation of the microcytic and macrocytic cell proportions.



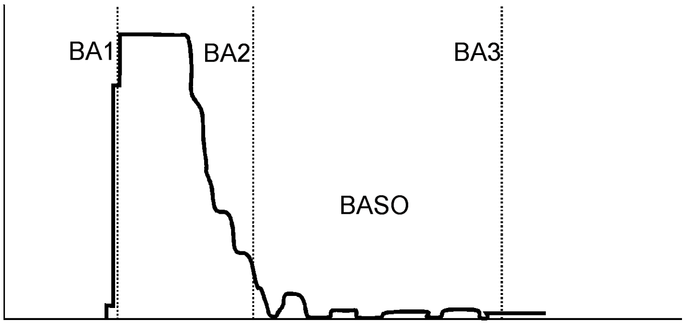
Diag.2:RBC Histogram

C. PLT identifier
The threshold 1 is the number of the last channel used to calculate the PLT number.



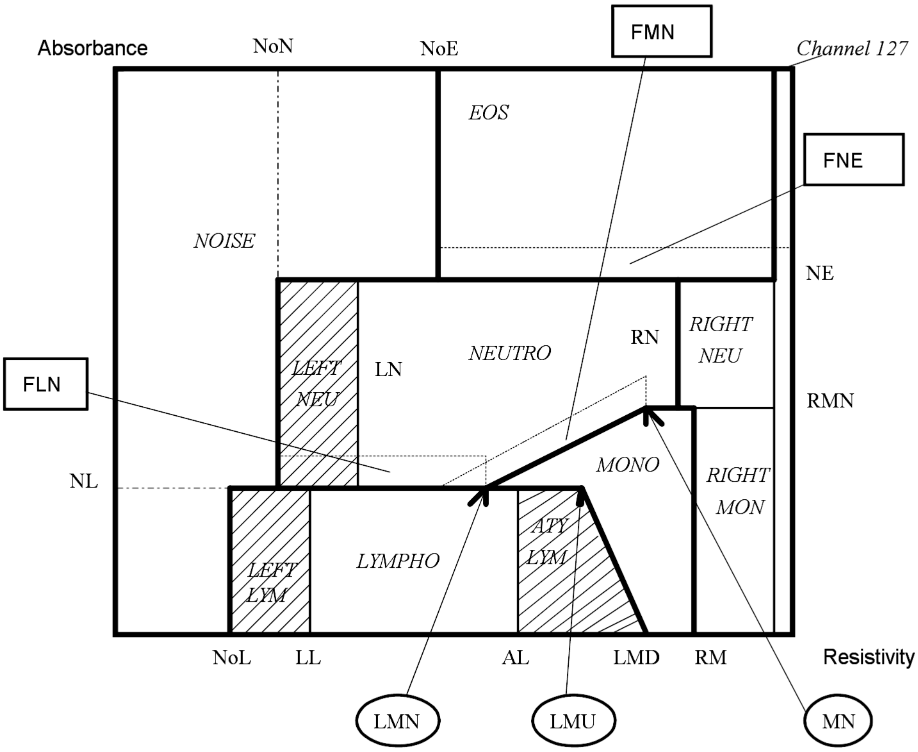
Diag.3:PLT Histogram

D. Basophil identifier
Thresholds 1-2-3 allow the determination of the basophil proportion regarding the total number of WBCs.

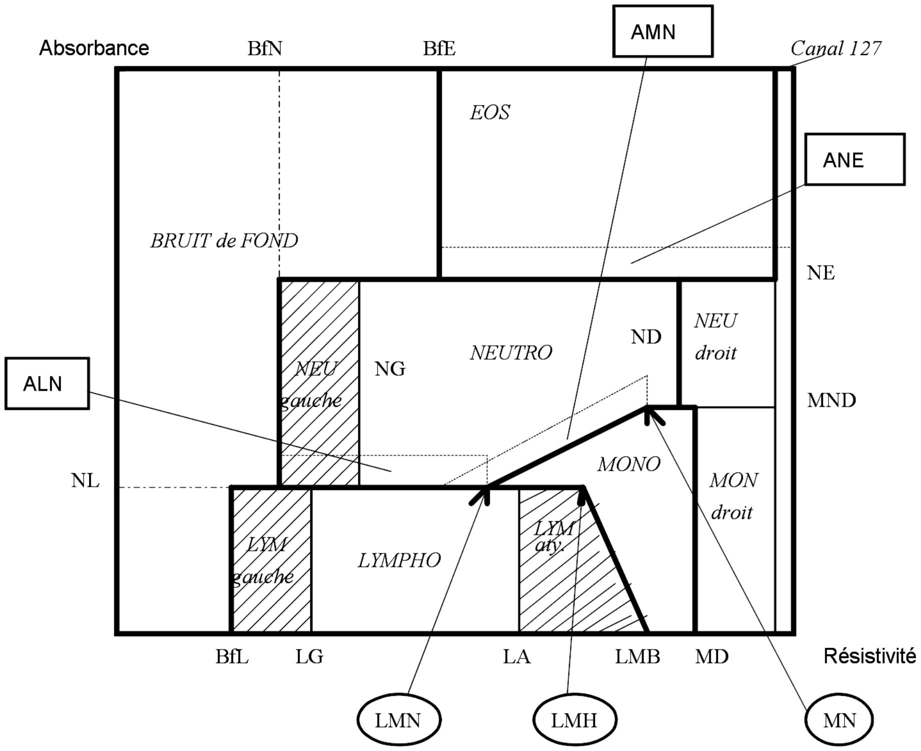


Diag.4:Basophil Histogram

E. Lmne matrix identifier
The 12 resistive thresholds are transmitted in the following order : NoL, NoN, NoE, LN, RN, LL, AL, LMU, LMD, LMN, MN, RM. The 3 absorbance thresholds are following : NL, NE, RMN. At the end the width of the areas (in channel number) describing the proximity flags : FNE, FMN, FLN are transmitted .
Areas surrounded by bolt lines give the matrix populations. Names of the populations are shown in italic. Hatched areas give the sub populations and belong to the main population. Framed items are the proximity flags. Surrounded items are inflexion points similar to separation thresholds.


Absorbance
NoN
NoE
FMN
Channel 127
EOS
FNE
NOISE
NE
RN
RIGHT NEU
LEFT NEU
LN
NEUTRO
FLN
RMN
MONO
RIGHT MON
NL
ATY LYM
LEFT LYM
LYMPHO
NoL
LL
AL
LMD
RM
Resistivity
LMN
LMU
MN

Diag.5:Matrix in english


Absorbance
BfN
BfE
AMN
Canal 127
EOS
ANE
BRUIT de FOND
NE
NEU gauche
NG
NEUTRO
ND
NEU droit
ALN
MND
MONO
NL
MON droit
LYM gauche
LYMPHO
LYM aty.
BfL
LG
LA
LMB
MD
Résistivité
LMN
LMH
MN

Diag.6:Matrix in french

1.6. Patient result identification

1.6.1. Format description

All the described fields have a fixed size character string type and are completed with spaces for the non significant informations.

1.6.2. Identifier list

Table 11: Patient result identifier list

Identifiers		Correspondance	Formats	Length
$70	p	Analyzer number	01	2 + 2 + 1
$71	q	Analysis date and time	94/06/06 13h15mn31s	2 + 19 + 1
$72	r	Analyzer run number	115	2 + 16 + 1
$73	s	Analyzer sequence number	0128	2 + 4 + 1
$74	t	Sampling mode	'M' : (manual) open tube 'R' : (rack) close tube	2 + 1 + 1
$75	u	Identification number or sample identification	1450302154275-42	2 + 16 + 1
$76	v	Identification or patient name	SMITH Ronald	2 + 30 + 1
$77	w	Birth date	yy/mm/dd	2 + 8 + 1
$78	x	Age	7d, 4w, 10m, 54y	2 + 3 + 1
$79	y	Sex	2	2 + 1 + 1
$7A	z	Origin	F	2 + 1 + 1

Table 11: Patient result identifier list

Identifiers		Correspondance	Formats	Length
$7B	{	Doctor	Dr Jones	2 + 15 + 1
$7C	|	Department	Hemato	2 + 10 + 1
$7D	}	Drawing date	94/06/06 13h15	2 + 14 + 1
$7E	~	Comments		2 + 32 + 1
$7F		Blood type	Human	2 + 16 + 1
$80	ç	Analysis type	Defined on 1 character: ’A’ : CBC ’B’ : DIFF ’C’ : RET ’D’ : LMG ’E’ : CBR ’F’ : DIR	2 + 1 + 1
$81	ü	Sample rack type	’0’ : 10 positions ’1’ : 15 positions ’2’ : 32 positions	2 + 1 + 1
$82	é	Number of runs	’0’ : first run ’1’ : second run etc...	2 + 1 + 1
$83	â	Operator code	BOB	2 + 3 + 1
$88	ê	Sampling without detection	’W’ or ’ ’ (space)	2 + 1 + 1
$89	ë	SPS smearing mode	3 characters: ECC E: smearing (Etalement) C: Staining (Coloration) C: Criteria	2 + 3 + 1
$8A	è	SPS smearing profile	4 character chain : 65G4 Drop volume, angle, speed	2 + 4 + 1
$8B	ï	Patient identification		2 + 30 + 1

- The date format ($71, $77, $7D) depends on the date format setup by the user.
- $78 : the strings smaller than the expected charcter number have to be completed on the right handside by "spaces".
- There is no check on $77 compare to $78 which is involved into the automatic type selection $7f
- When the file is received without $89, the default setup is applied.

1.6.3. Analysis type ($80)

This identifier allows to identify the analysis type : CBC, DIF to be carried out on the sample. It gives also the access to the analysis of one or several specific parameters. The CBC analysis includes the 12 CBC's parameters. The DIF analysis includes the CBC analysis and the 14 results in % and # of the WBC sub-populations. The analysis of one or several specific parameters can be set up by the user. The LMG analysis includes the CBC analysis and the 6 results in % and # of the WBC sub-populations.

FORMAT: $80 $20 one character from 'A' or 'B' $0D

1.7. Packet type

The information described in the packet type allows the specification of the global message content: hematological routine results or statistic results.

1.7.1. Data exported by the analyzer

A. Packet type liste

Table 12: Packet type list

Data packet string (8 char.)	Use
RESULT	Hematological result transmission on a routine mode
RES-RR	Hematological result transmission on automatic re-sampling mode
REASSESS	Result transmission of a recalculated sample using the recalculation user function
RESNOR-H	Transmission of the high normalities for the specified type
RESNOR-L	Transmission of the low normalities for the specified type
QC-RES-H	Result transmission of a high level control blood
QC-RES-M	Result transmission of a median level control blood
QC-RES-L	Result transmission of a low level control blood
FILE	Patient file request
END	Connection end

Example:
The packet type 'RESULT' will be followed by hematological parameters or matrix and histograms.

B. "FILE" request
The data packet "FILE" will be followed by $72 or $75 or $76 representing the patient file in order to obtain the type of test to be run on the corresponding sample. In the "TSO" operation mode, this request is performed by the host to the analyzer.
Example with the ID Nb : $FF $20 FILE $20 $20 $20 $20 $0D $75 $20 971224000252 $20 $20 $20 $20 $0D

Each data packet "FILE" will be preceeded and followed by STX and ETX. Several requests of this type can be chained between a line bid and a line free in order to organize the grouping of the requests for the instruments equipped with an automatic sampling mode.

1.7.2. Data interpreted by the analyzer

A part of these data packet files will be available only if the instrument has been set up with the remote controlled mode.

Table 13: Data interpreted by the analyzer

Data packet string	Use
FILE	Patient file reception
END	Line free message
MOD-OS9	Reception of a binary module OS9 type
AUTO	Start of an automatic sampling (closed tube)
MANUAL	Start of a manual sampling (open tube)
STOP	Emergency stop
STOPAUTO	Automatic sampling stop
DILUENT	Diluent rinse
LYSE	Lyse priming
CLEANER	Cleaning
EOSINO	Eosinofix priming
BASO	Basolyse priming
RETIX	Retix priming
CLRNEEDL	Needle cleaning
BCKFLUSH	Backflush

Table 13: Data interpreted by the analyzer

Data packet string	Use
DRAIN	Drain chambers
CONTROL	Autocontrol cycle
STARTUP	Startup
SHUTDOWN	Shutdown
RUNCYCLE	Startup of a specific cycle (see description)
BURN-IN	Burn-in running mode
BURN-end	End of the burn-in mode
REMOTE	Remote control running mode
ERROR	Always followed by a number $FC type listed in the error list
STANDARD	End of the remote control mode
CONFIG	Transmission of the instrument specific setup (text format + separator)

1.8. Other identifiers

Identifier $FB: identifies the analyzer type when communicating.

Identifier $FC: This identifier allows the transmission of a number which can be an error number, a position number, a burn-in sequence number or a status in hexadecimal mode (Not available yet).

Identifier $FD: Checksum value (see section on the message structure).

Identifier $FE: The version number is linked to the development of the hematological message identifiers.

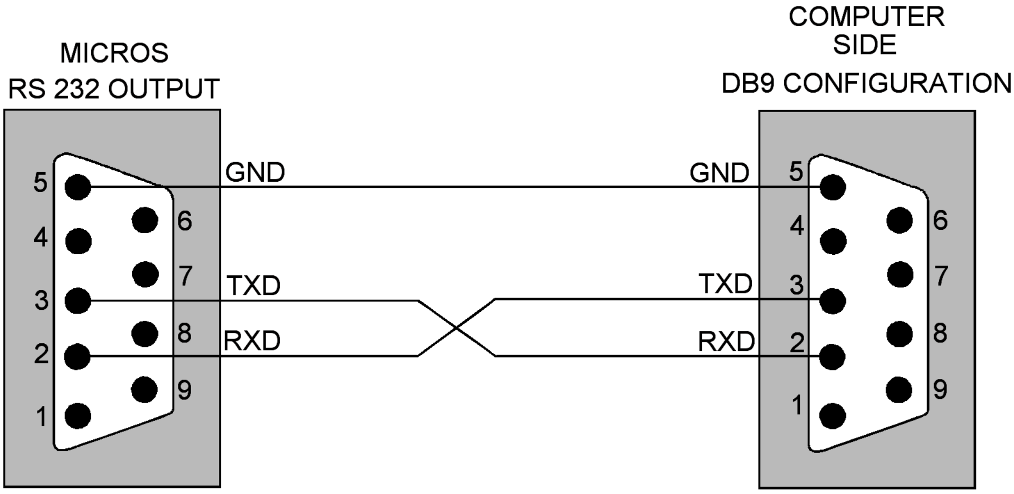
Identifier $FC The error list is dedicated to the "remote" mode, however the MICROS instrument is able to transmit the error #0001 (Operating temperature out of limits).

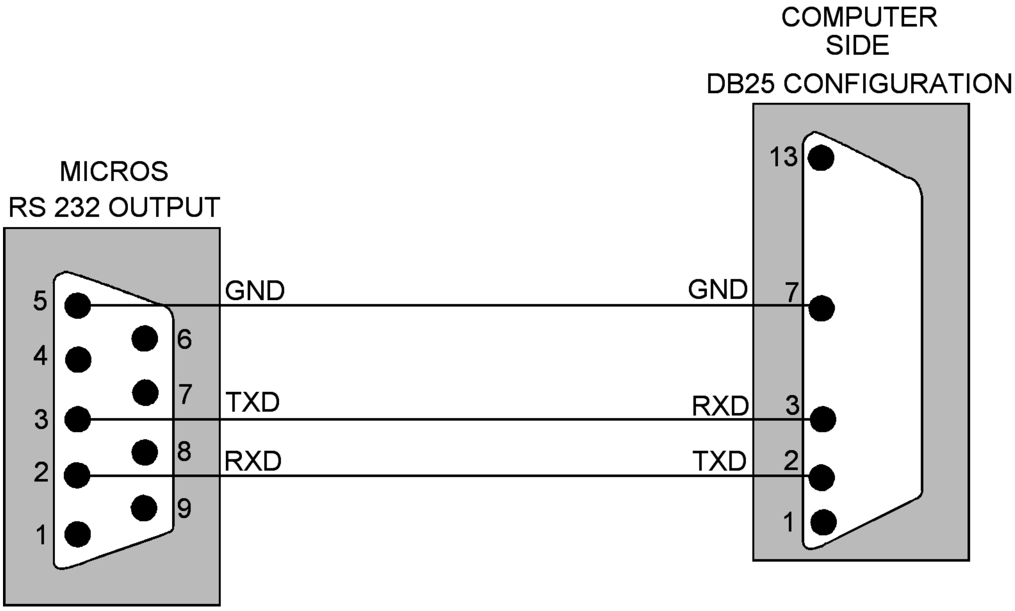
Table 14: Other identifiers

Identifiers		Correspondance	Formats	Lengths
$FB		Analyzer name	Character string	2 + 8 + 1
$FC		Number	8 decimal bytes	2 + 8 + 1
$FD		16 bits check sum value	4 hexadecimal bytes	2 + 4 + 1
$FE$FF		Version N° of Identifier list	String of characters : Vx.xx	2 + 5 + 1

For $FB and $FF, the strings having less than 8 characters are completed on the right handside by "spaces".

2. PIN assignments


MICROS
RS 232 OUTPUT
COMPUTER
SIDE
DB9 CONFIGURATION
5
4
3
2
1
6
7
8
9
GND
TXD
RXD
GND
TXD
RXD
5
4
3
2
1
6
7
8
9


MICROS
RS 232 OUTPUT
COMPUTER
SIDE
DB25 CONFIGURATION
5
4
3
2
1
6
7
8
9
GND
TXD
RXD
GND
RXD
TXD
13
7
3
2
1

3. ARGOS format principles

ARGOS format is implemented to assume compliance with the Argos series. For new implement, ABX recommend to use ABX format (see paragraph 1).

3.1. Introduction

The ARGOS format is a fixed format (406 characters for one result) including a STX and a ETX. These characters are splitted into fields representing a transmitted item.

406 CHARACTERS

STX	DATA	CRC	ETX

The data transmitted can be a result:

STX	«R» / ANALYSER # / N°ID / ID / etc..	CRC	ETX

or a patient file:

STX	«D» / ANALYSER # / N°ID / ID / etc..	CRC	ETX

or end of communication:

STX	«E» / ANALYSER # / etc..	CRC	ETX

The fields have a fixed length separated by the OD character.

3.2. Results characteristics

3.2.1. Key

Total ASCII characters emitted : 406

- (-) : Space $20

- (]) : Carriage return $0D

- CRC : exclusive "OR" of all the transmitted bytes except ETX and STX, then an inclusive "OR" with a $4O value.

- zzzzz : numeric field completed by zeros on the left.
ex : 04.55 (decimal separation with a period).
When the analyser does not transmit parameters, the field (zzzzz) is put in place of (--.--).

- Y : Alphanumeric character from $20 to $7F.

- # : Space ($20) if automatic sampling. Star ($2A) if manual sampling.

3.2.2. Result format

Line 1 :	STX ($02)		Start of text	1
Line 2 :	R ($52)		Character "R"	1
Line 3 :	zz]		Analyser No	2 + 1
Line 4 :	YYYYYYYYYYYYYYYY]		Identification No	16 + 1
Line 5 :	YYYYYYYYYYYYYYYYYYYYYYYYYYYYYY]		Identification	30 + 1
Line 6 :	zz/zz/zz-zzhzzmnzzs#]		Time & Date	20 + 1
Line 7 :	zzzzz-RN]	GB	rejection & limits	8 + 1
Line 8 :	zzzzz-RN]	LYC#	rejection & limits	8 + 1
Line 9 :	zzzzz-RN]	LYC%	rejection & limits	8 + 1
Line 10 :	zzzzz-RN]	MON#	rejection & limits	8 + 1
Line 11 :	zzzzz-RN]	MON%	rejection & limits	8 + 1
Line 12 :	zzzzz-RN]	GRA#	rejection & limits	8 + 1
Line 13 :	zzzzz-RN]	GRA%	rejection & limits	8 + 1
Line 14 :	zzzzz-RN]	NEU#	rejection & limits	8 + 1
Line 15 :	zzzzz-RN]	NEU%	rejection & limits	8 + 1
Line 16 :	zzzzz-RN]	EOS#	rejection & limits	8 + 1
Line 17 :	zzzzz-RN]	EOS%	rejection & limits	8 + 1
Line 18 :	zzzzz-RN]	BAS#	rejection & limits	8 + 1
Line 19 :	zzzzz-RN]	BAS%	rejection & limits	8 + 1
Line 20 :	zzzzz-RN]	ALY#	rejection & limits	8 + 1
Line 21 :	zzzzz-RN]	ALY%	rejection & limits	8 + 1
Line 22 :	zzzzz-RN]	LIC#	rejection & limits	8 + 1
Line 23 :	zzzzz-RN]	LIC%	rejection & limits	8 + 1
Line 24 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 25 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 26 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 27 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 28 :	zzzzz-RN]	RBC	rejection & limits	8 + 1
Line 29 :	zzzzz-RN]	HGB	rejection & limits	8 + 1
Line 30 :	zzzzz-RN]	HCT	rejection & limits	8 + 1
Line 31 :	zzzzz-RN]	MCV	rejection & limits	8 + 1
Line 32 :	zzzzz-RN]	MCH	rejection & limits	8 + 1
Line 33 :	zzzzz-RN]	MCHC	rejection & limits	8 + 1
Line 34 :	zzzzz-RN]	RDW	rejection & limits	8 + 1
Line 35 :	zzzzz-RN]	RET*	rejection & limits	8 + 1
Line 36 :	zzzzz-RN]	PLT	rejection & limits	8 + 1
Line 37 :	zzzzz-RN]	MPV	rejection & limits	8 + 1
Line 38 :	zzzzz-RN]	PCT	rejection & limits	8 + 1
Line 39 :	zzzzz-RN]	PDW	rejection & limits	8 + 1
Line 40 :	ABCDEFGHIJKLMNOPQRSTU]		WBC 5 DIFF Flags	21 + 1
Line 41 :	LMMGGG]		WBC LMG Flags	6 + 1
Line 42 :	PSM]		PLT Flags	3 + 1
Line 43 :	CRC			1
Line 44 :	ETX ($03)		end of text	1

5DIFF FLAGS		
Char.	FR	GB
A	Lg	LL
B	Ln	NL
C	Mn	MN
D	Ng	LN
E	Md	RM
F	Nd	RN
G	No	NO
H	Co	CO
I	Ne	NE
J	X2	X2
K	X3	X3
L	MP**	MP**
M	LOW	LOW
N	LAS	LAS
O	PIT	PIT
P	Mb	MB
Q	FIT	FIT
R	NRBC	NRBC
S	Bg	LB
T	W1	W1
U	W2	W2

3.3. Patient file characteristics

3.3.1. Key

- (]) : Carriage return $OD.

- CRC : Exclusive “OR” of all the transmitted bytes, except ETX and STX, then the inclusive “OR” with a $40 value.

- Y, Z : Alphanumeric character from $20 to $7F.

3.3.2. Patient file format

Table 15: Patient file format

Line 1	STX ($02)	Start of text	1
Line 2	D ($44)	Character «D»	1
Line 3	zz]	Analyser No	2 + 1
Line 4	YYYYYYYYYYYYYYYY]	Identification No	16 + 1
Line 5	YYYYYYYYYYYYYYYYYYYYYYYYYYYYYY]	Identification	30 + 1
Line 6	zz/zz/zz]	Date of birth	8 + 1
Line 7	YYY]	Age	3 + 1
Line 8	z]	Sex	1 + 1
Line 9	Y]	From	1 + 1
Line 10	YYYYYYYYYYYYYYY]	Doctor	15 + 1
Line 11	YYYYYYYYYY]	Department	10 + 1
Line 12	YYYYYYYYYYYYYY]	Sampling date	14 + 1
Line 13	YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY]	comments	32 + 1
Line 14	CRC	end of text	1
Line 15	ETX ($03)		1
		Total:	147

3.4. End of communication

3.4.1. Key

- (]) : Carriage return $OD.

- CRC : Exclusive “OR” of all the transmitted bytes, except ETX and STX, then the inclusive “OR” with a $40 value.

- zz : Number of the analyser.

3.4.2. Line free format

Table 16: Line free format first digit

First digit (letter)	Correspondance
R	Parameter rejected for a counting default
B	Incorrect balance between the counting methods
S	Suspicious parameter value
'space'	No anomaly observed
Second digit (letter)	correspondance
L	Parameter < to the lower extreme value
l	Parameter < to the low normal value
'space'	Parameter normal value
h	Parameter > to the high normal value
H	Parameter > to the high extreme value
O	Parameter exceeding the capacity

Table 17: Line free format second digit

Second digit (letter)	Correspondance
L	Parameter < to the lower extreme value
l	Parameter < to the low normal value
'space'	Parameter normal value
h	Parameter > to the high normal value
H	Parameter > to the high extreme value
O	Parameter exceeding the capacity

4. ASTM Specifications

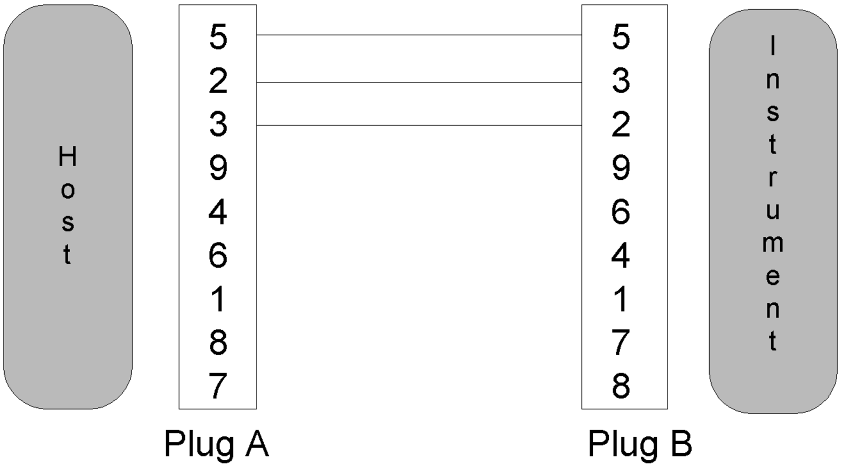
ABX Diagnostics analyzers format responds to the ASTM specifications (E-1381 & E-1394). These norms are described in the «annual book of ASTM standards».

For further details about the connection of an ABX Diagnostics analyzer call ABX Diagnoctics.

4.1. Hardware and software characteristics

Default format for emitted character is 1 bit start, 8 data bits, No parity, 1 bit stop.
Default communication speed is 38400 bauds.

Hardawre setting of the interface: Plug A&B are DB9 male plugs



4.2. Output data characteristics

Characters: ASCII
Maximum message length: 247 characters.
Analyzer manages Xon/Xoff protocol.

4.3. Communication protocol

Characters sent by computer when transmission is correct: ACK (06h)
Characters sent by computer when transmission is not correct: NACK (15h)
Number of transmission if negative answer: 6
Timeout: 15s
Special timing: None
Description of other specific treatments: None

In case of ENQ\ENQ conflict analyzer waits for 2s and try emmission again, in case of 6 successive tries, analyzer will wait from 500ms to 10s (parametrable) before an another downloading request.

Analyzer is master in case of conflict.

A transfer can contain several results.

4.4. ASTM frames format

Table 18: Frames format

ASTM field	Definition	Transmitted data	# of bytes	Comments
0	STX	02H	1	
1	Frame number	0 to 7	1	Frame nuber is to permit the receiver to distinguish between new retransmitted frames Frame number is set to 1 when transfer phase is initialized and is incremented by 1 for each frame up to 7 and then returns to 0
2	Data message		240 max.	Header, Patient, Order, Result & Comment messages
3	End of data message ETX if end frame ETB if intermediate frame		1	
4	Checksum		2	
5	CRLF	0DH 0AH	2	

4.5. Message packets (General format)

4.5.1. Header record

Table 19: Analyzer emission fields (ASTM)

ASTM field	Definition	Transmitted data	# of bytes
7.1.1	Record Type	H	1
7.1.2	Delimiters	idem standard: | Field demimiter \ Repeat delimiter ^ Component delimiter & Escape delimiter	4
7.1.3	Message Control ID		
7.1.4	Access Password		
7.1.5	Sender Name	Text	3
7.1.6	Sender Address		
7.1.7	Reserved		
7.1.8	Sender Telephone Nb		
7.1.9	Characteristics of Sender		
7.1.10	Receiver ID		
7.1.11	Comments or Special Instructions		
7.1.12	Processing ID	P	1
7.1.13	ASTM Version Nb	E 1394-97	
7.1.14	Date and Time of message	format § 6,6,2	14

4.5.2. Patient information record

Table 20: Patient information

ASTM field	Definition	Transmitted data	# of bytes
8.1.1	Record Type	P	1
8.1.2	Sequence Nb	1 to n	1
8.1.3	Practice Assigned Patient ID		
8.1.4	Laboratory Assigned Patient ID	Patient Id	25
8.1.5	Patient ID No 3		
8.1.6	Patient Name	Text	20
8.1.7	Mother's Maiden Name		
8.1.8	Birthdate	YYYYMMDD	8
8.1.9	Patient Sex	M,F ou U	1
8.1.10	Patient Race-Ethnic Origin		
8.1.11	Patient Address		
8.1.12	Reserved		
8.1.13	Patient Telephone Nb		
8.1.14	Attending Physician ID	Text	20
8.1.15	Special Field 1		
8.1.16	Special Field 2		
8.1.17	Patient Height		
8.1.18	Patient Weight		
8.1.19	Patient's Known or Suspected Diagnosis		
8.1.20	Patient Active Medication		
8.1.21	Patient's Diet		
8.1.22	Practice Field 1		
8.1.23	Practice Field 2		
8.1.24	Admission and Discharge Dates		
8.1.25	Admission Status		
8.1.26	Location	Text	20
8.1.27	Nature of Alternative Diagnostic Code and Classifiers		
8.1.28	Nature of Alternative Diagnostic Code and Classifiers		
8.1.29	Patient Religion		
8.1.30	Martial status		
8.1.31	Isolation Status		
8.1.32	Language		
8.1.33	Hospital Service		
8.1.34	Hopital Institution		
8.1.35	Dosage Category		

4.5.3. Test order record

Table 21: Test specifications

ASTM field	Definition	Transmitted data	# of bytes
9.4.1	Record Type	O	1
9.4.2	Sequence Nb	1, 2, 3…	1
9.4.3	Specimen ID	Sample id	16
9.4.4	Instrument Specimen ID	Instrument seq. #	
9.4.5	Universal Test ID	3 délimiteurs de composant + nom du test	3
9.4.6	Priority		
9.4.7	Requested/Ordered Date and Time		
9.4.8	Specimen Collection Date and Time	YYYYMMDDHHMMSS	
9.4.9	Collection End Time	YYYYMMDDHHMMSS	
9.4.10	Collection Volume		
9.4.11	Collector ID		
9.4.12	Action Code	C: cancel request N: New request A: Add request Q: QC request	
9.4.13	Danger Code		
9.4.14	Relevant Clinical Informations	Text	
9.4.15	Date/Time Specimen Received		
9.4.16	Specimen Descriptor	Text	
9.4.17	Ordering Physician		
9.4.18	Physician Tel Nb		
9.4.19	User Field 1		
9.4.20	User Field 2		
9.4.21	Laboratory Field 1		
9.4.22	Laboratory Field 2		
9.4.23	Date and Time Results reported or last modified		
9.4.24	Instrument Charge to Computer System		
9.4.25	Insteument Section ID		
9.4.26	Report Types	F :final, C :correction, I : en attente de traitement, Y :pas d’ordre de test pour cet échantillon, Z :pas d’enregistrement pour ce patient	1
9.4.27	Reserved		
9.4.28	Location or Ward of Specimen Collection		
9.4.29	Nosocomial Infection Flag		
9.4.30	Specimen Service		
9.4.31	Specimen institution		

4.5.4. Result record

Table 22: Types of result specifications

ASTM field	Definition	Transmitted data	# of bytes
10.1.1	Record Type	R	1
10.1.2	Sequence Nb	1, 2, 3…	1
10.1.3	Universel Test ID	^^^Result name in english^LOINC code	4^7
10.1.4	Data or Measurement Value	Test result	
10.1.5	Units		
10.1.6	Reference Range		
10.1.7	Result Abnormal Flag	Analytical flag L,H,LL,HH,>	1 or 2
10.1.8	Nature of Abnormality Testing		
10.1.9	Result Status	W: suspicion N: rejeted result F: final result C: rerun result	1
10.1.10	Date of Change in Normative Values or Units		
10.1.11	Operator Identification		
10.1.12	Date/Time Test Starting		
10.1.13	Date/Time Test Completed	YYYYMMDDHHMMSS	
10.1.14	Instrument Identification		

4.5.5. Comment record

Table 23: Comments specifications

ASTM field	Definition	Transmitted data	# of bytes
11.1.1	Record Type	C	1
11.1.2	Sequence Nb	1, 2, 3…	1
11.1.3	Comment Source	I clinical instrument system	1
11.1.4	Comment Text	Text	100
11.1.5	Comment Type	G:free text I: Instrument flag comment	1

4.5.6. Terminator record

Table 24: Terminator record

ASTM field	Definition	Transmitted data	# of bytes
13.1.1	Record type	L	1
13.1.2	Sequence number	1	1
13.1.3	Termination code	N=Normal	1

4.6. Special caracteristics for ABX datas

4.6.1. Data presentation

Table 25: Data presentation

Parameter	Units	Loinc identifier	English code
Globules blanc	Standard	804-5	WBC
Lymphocytes	#	731-0	LYC#
	%	736-9	LYC%
Monocytes	#	742-7	MON#
	%	744-3	MON%
Granulocytes	#	20482-6	GRA#
	%	14773-6	GRA%
Neutrophiles	#	751-8	NEU#
	%	770-8	NEU%
Eosinophiles	#	711-2	EOS#
	%	713-8	EOS%
Basophiles	#	704-7	BAS#
	%	706-2	BAS%
Lymphocytes atypiques	#	733-6	ALY#
	%	735-1	ALY%
Grande cellule immature	#		LIC#
	%	11117-9	LIC%
Globules rouges	Standard	789-9	RBC
Hémoglobine		717-9	HGB
Hématocrite		4544-3	HCT
Volume globulaire		787-2	MCV
TGMH		785-6	MCH
CCMH		786-4	MCHC
Indice de distribution		788-0	RDW
Réticulocytes	#	4679-7	RET#
	%	12250-7	RET%
Réticulocytes bas	%		RETL%
Réticulocytes médians	%		RETM%
Réticulocytes hauts	%		RETH%
Mean Fluorescence Index	%		MFI
Mean reticulocyte volume	Standard		MRV
Corrected réticulocyte concentration	%		CRC
C reactive protein	µg/ml		CRP
Immatures réticulocyte	%		IMM%
Immature reticulocyte fraction			IRF
Plaquettes	Standard	777-3	PLT
Volume moyen		776-5	MPV
THT			THT
Indice de distribution			PDW

4.6.2. Alarms and Pathologies

ASTM specification had no reserved field for pathologies. Pathology messages are sent through the comment record.

Table 26: Alarms

Alarm type	Identifier
ALARM_WBC	MP, MB, CO, NE, LL, NL, MN, LN, RM, RN, NO, LB, L1, M1, M2, G1, G2, G3, LI1, BASO, WBC1, WBC2, Lmne+, Lmne-, Baso+, Baso-
ALARM_RBC	Mi, Ma
ALARM_PLT	PC, MC, SC
ALARM_RET	Low, Las, Pit, Fit, Nrbc
ALARM_ANALYSER	XB, XR, QC, WESTGARD, STARTUP FAILED, STARTUP NOTDONE, STARTUP NOTEFFECTIVE, FOR INVESTIGATIONAL USE ONLY

Table 27: Pathologies

Populations	Messages	Signification
WBC	LEUCOCYTOSIS	Leucocytose
	LEUCOPENIA	Leucopénie
	LYMPHOCYTOSIS	Lymphocytose
	LYMPHOPENIA	Lymphopénie
	NEUTROPHILIA	Neutrophilie
	NEUTROPENIA	Neutropénie
	EOSINOPHILIA	Eosinophilie
	MYELEMIA	Myélémie
	LARGE IMMATURE CELL	Grandes Cellules Immatures
	ATYPICAL LYMPHOCYTE	Lymphocytes atypiques
	LEFT SHIFT	Formule Gauche
	NRBCs	Erythroblastes
	MONOCYTOSIS	Monocytose
	BASOPHILIA	Basophilie
	BLASTS	Blastes
	PANCYTOPENIA	Pancytopénie
	WBC INTERPRETATION IMPOSSIBLE	
RBC	ANEMIA	Anémie
	ANISOCYTOSIS	
	ANISOCYTOSIS+	
	ANISOCYTOSIS++	Anisocytose degré 1, 2 ,3
	MICROCYTES	
	MICROCYTES+	
	MICROCYTES++	Microcytes degré 1, 2 ,3
	MACROCYTES	
	MACROCYTES+	
	MACROCYTES++	Macrocytes degré 1, 2 ,3
	MICROCYTOSIS	Microcytose
	MACROCYTOSIS	Macrocytose
	HYPOCHROMIA	

Table 27: Pathologies

Populations	Messages	Signification
	HYPOCHROMIA+	
	HYPOCHROMIA++	Hypochromie degré 1, 2 ,3
	COLD AGGLUTININES	Agglutinine froide
	PANCYTOPENIA	Pancytopénie
	RBC INTERPRETATION IMPOSSIBLE	
PLT	THROMBOCYTOSIS	Thrombocytose
	THROMBOPENIA	Thrombopénie
	PLATELET AGGREGATS	Agrégats plaquettaires
	SMALL CELLS	Petits éléments cellulaires
	MICROCYTES	Microcytes
	SCHIZOCYTES	Schisocytes
	MACROPLATELETS	Macro plaquettes
	PANCYTOPENIA	Pancytopénie
	PLT INTERPRETATION IMPOSSIBLE	
RETICULOCYTES	IMMATURE	Réticulocytes Immatures
	RETICULOCYTOSIS	Réticulocytose
	RETICULOPENIA	Réticulopénie
	RET INTERPRETATION IMPOSSIBLE	

Alarms & error list

1. Analyzer error types and help messages 7-2
2. Transfer error types an help messages......................7-3
3. STAT mode error type and help messages................7-4
4. Environment error type and help messages..............7-4
5. User error types and help messages.........................7-5
6. Expiration date error types and help messages.........7-5
7. Analyzer internal barcode error types and help messages 7-6

1. Analyzer error types and help messages

Table 1: Analyzer error types and help messages

Alarm	Error type	Help message
Carriage motor failure	Carriage Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
Carriage mechanism not reaching home	Carriage Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
Counting syringe motor failure	Counting Syringe Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
Counting syringe mechanism not reaching home	Counting Syringe Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
Diluter syringe motor failure	Diluter Syringe Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
Diluter syringe mechanism not reaching home	Diluter Syringe Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
DRAIN 1 syringe motor failure	DRAIN 1 Syringe Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
DRAIN 1 syringe mechanism not reaching home	DRAIN 1 Syringe Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
DRAIN 2 syringe motor failure	DRAIN 2 Syringe Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
DRAIN 2 syringe mechanism not reaching home	DRAIN 2 Syringe Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
Drain sensor [sensor number (1, 2 or 3)] time out	Drain Sensor	Run an Auto Clean
Injection syringe motor failure	Injection Syringe Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
Injection syringe mechanism not reaching home	Injection Syringe Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
LMNE transfer sensor time out	LMNE transfer sensor	Run an Auto Clean
Needle motor failure	Needle Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
Needle mechanism not reaching home	Needle Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
Piercing UP or DOWN bad position	Piercing Syringe Motor	Run an Auto Clean Check Motor in Service Menu
Reagent temperature out of range. Value Min. & Max.	Reagent Temperature	Run an initialization
Reagent Temperature sensor not connected	Reagent Temperature sensor	Run an initialization
Reagent Temperature sensor failure	Reagent Temperature sensor	Run an initialization
Sampling syringe motor failure	Sampling Syringe Motor home switch always detected	Run an Auto Clean Check Motor in Service Menu
Sampling syringe mechanism not reaching home	Sampling Syringe Motor Mechanism initialization failed	Run an Auto Clean Check Motor in Service Menu
Thermostated Compartment Temperature sensor not connected	Thermostated Compartment Temperature	Run an initialization
Thermostated Compartment Temperature sensor failure	Thermostated Compartment Temperature	Run an initialization

Table 1: Analyzer error types and help messages

Alarm	Error type	Help message
Thermostated Compartment temperature out of range. Value Min. & Max.	Thermostated Compartment Temperature	Run an initialization

2. Transfer error types an help messages

Table 2: Transfer error types and help messages

Alarm	Error type	Help message
Loading motor mechanism not reaching home	Sampler Loading Motor Mechanism initialization failed	Run an initialization Check motor in Service Menu
Loading motor failure	Sampler Loading Motor home switch always detected	Run an initialization Check motor in Service Menu
Stop rack loading switch not detected	Sampler Loading Motor	Run an initialization Check motor in Service Menu
Stop rack loading switch detected	Sampler Loading Motor	Run an initialization Check motor in Service Menu
Sampler Transfer mechanism not reaching home	Sampler Transfer Motor Mechanism initialization failed	Run an initialization Check motor in Service Menu
Sampler Transfer motor failure	Sampler Transfer Motor home sensor always detected	Run an initialization Check motor in Service Menu
Stop rack Transfer switch not detected	Sampler Transfer Motor End transfer rack switch not detected	Run an initialization Check switch in Service Menu
Stop rack Transfer switch detected	Sampler Transfer Motor End transfer rack switch always detected	Run an initialization Check switch in Service Menu
Mixer mechanism not reaching home	Mixer Motor Mechanism initialization failed	Run an initialization Check motor in Service Menu
Mixer motor failure	Mixer Motor home sensor always detected	Run an initialization Check motor in Service Menu
Mixer Bad graber position	Mixer Motor Grabers sensor position not detected	Run an initialization Check motor in Service Menu
Mixer Bad graber position	Mixer Motor Grabers sensor position detected	Run an initialization Check motor in Service Menu
Rack in rong side position	Rack in the wrong side in loading area	Set rack in the right side position and restart automatic cycle
No rack	No Rack in loading area	No message
Unloading area full	Unloading area full	Unload racks and restart automatic cycle
Tube too high in rack	Tube too high. tube may not be correctly inserted in rack	Run an initialization. Open left front cover and remove rack from loading area. Close left front cover and restart automatic cycle
Bad rack transfer movement (left)	Movement control	Run an initialization
Bad rack transfer movement (right)	Movement control	Run an initialization
Front cover open	Front cover open	Close front covers Run an initialization

3. STAT mode error type and help messages

Table 3: STAT mode error types and help messages

Alarm	Error type	Help message
Tube holder mechanism failure	Door not open	No message

4. Environment error type and help messages

Table 4: Environment error types and help messages

Alarm	Error type	Help message
%d Incoherent(s) Result(s) for %s	Incoherent Results	Run an initialization
Communication With Analyzer Cut Off	System	Run an initialization
Communication With Analyzer Failed	System	Run an initialization
End Sampler Transfer Sensor Error	Sensor state	Run an initialization
Error on raw results sending	Result failed	Run an initialization
Holder Sensor 1 in Wrong Position	Sensor state	Run an initialization
Holder Sensor 2 in Wrong Position	Sensor state	Run an initialization
Holder Sensor 3 in Wrong Position	Sensor state	Run an initialization
Holder Sensor 4 in Wrong Position	Sensor state	Run an initialization
Loader Left Sensor Error	Sensor state	Run an initialization
Loader Right Sensor Error	Sensor state	Run an initialization
Lower Piercing Sensor in Wrong Position	Sensor state	Run an initialization
Mismatch Between the First and Second Barcode Tube Read on Rack %d Pos. %d	Barcode	Run an initialization
No diluent in analyzer reservoir	Incorrect level of diluent into reservoir	Check diluent level and run a prime diluent cycle
Printer alarm	Printer problem	Check printer
Printer module closed	Software	No message
QC Failed	QC Failed	Ckeck Quality Control data in QC screen
Rack Moving Left Sensor Error	Sensor state	Run an initialization
Rack Moving Right Sensor Error	Sensor state	Run an initialization
Rack not identified	No read of Rack Barcode Label	Check barcode label
Reagent level too low for daily workload	Out of Reagent	Check reagent
Reagent level too low to run a analasys	Out of Reagent	Check reagent and restart automatic cycle
Reagent level too low to run a rack	Out of Reagent	Check reagent and restart automatic cycle

Table 4: Environment error types and help messages

Alarm	Error type	Help message
Result not stored	Software	Run an autoclean
RS232 alarm	RS232 external problem	Check host connection
Sample ID %d already in progress	Software	No message
SIL communication module closed	Software	No message
Tube Detection Sensor in Wrong Position	Sensor state	Run an initialization
Tube Level Detection Sensor in Wrong Position	Sensor state	Run an initialization
Two racks with same ID %d in transfer rail	Barcode	No message
Unable to launch print module	Software	No message
Unable to launch SIL communication module	Software	No message
Unloader Sensor in Wrong Position	Sensor state	Run an initialization
Upper Piercing Sensor in Wrong Position	Sensor state	Run an initialization
Waste container full	Waste Container Full	Empty waste container and restart automatic cycle
XB failed	XB failed	Ckeck XB in XB screen

5. User error types and help messages

Table 5: User error types and help messages

Alarm	Error type	Help message
Instrument stopped by user		Run an AutoClean
Instrument stopped by user at the end of analysis		Run an Initialization
Instrument stopped by user at the end of rack		

6. Expiration date error types and help messages

Table 6: Expiration date error types and help messages

Alarm	Error type	Help message
Reagent(s) %s expired		Change reagent and restart automatic cycle
QC Lot Nb\Barcode %s expirated		Check QC epiration date and use another QC Lot

7. Analyzer internal barcode error types and help messages

Table 7: Analyzer internal barcode error types and help messages

Alarm	Error type	Help message
Com error on slave %d	Communication error with slave	Run an Initialization
Error management failed	Unkwon cycle	Run an Initialization
Error on cycle %d		Run an Initialization
Error on start internal chrono.		Run an Initialization
Hgb Blank Error Management	Hgb blank cycle incorrect	Run an Autoclean
Home Motor %d error		Run an Initialization
Incorrect pos.motor carriage (%d) Min : %d Max : %d	Carriage motor bad position	Run an Initialization
Incorrect pos.motor counting (%d) Min : %d Max : %d (Incorrect pos.motor PRESSURE (%d) Min : %d Max : %d)	Pressure motor bad position	Run an Initialization
Incorrect pos.motor diluter (%d) Min : %d Max : %d	Diluter motor bad position	Run an Initialization
Incorrect pos.motor drain 1 (%d) Min : %d Max : %d) (Incorrect pos.motor FLUSH (%d) Min : %d Max : %d)	Flush motor bad position	Run an Initialization
Incorrect pos.motor drain 2 (%d) Min : %d Max : %d	DRAINING_2 motor bad position	Run an Initialization
Incorrect pos.motor injector (%d) Min : %d Max : %d	Injector motor bad position	Run an Initialization
Incorrect pos.motor loading (%d) Min : %d Max : %d	Loader motor bad position	Run an Initialization
Incorrect pos.motor mixer (%d) Min : %d Max : %d	Mixer motor bad position	Run an Initialization
Incorrect pos.motor needle (%d) Min : %d Max : %d	Needle motor bad position	Run an Initialization
Incorrect pos.motor sampling (%d) Min : %d Max : %d	Sampling motor bad position	Run an Initialization
Incorrect pos.motor tranfer (%d) Min : %d Max : %d	Translation motor bad position	Run an Initialization
Internal Barcode Error	Barcode internal connection problem	Run an Initialization
Internal synchronization failed	System stop due to synchronization problem	Run an Autoclean
Motor %d is busy		Run an Initialization
Run a new cycle while analyzer is busy	Analyzer already in cycle	Run an Autoclean
Valve already activated		Run an Initialization

Maintenance

1. Maintenance 8-2
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1. Maintenance

1.1. Introduction

Customer maintenance has to be carried out according to the recommended frequency chart table and after having attended an ABX approved customer training course.
The system warranty may be affected if damage occurs after a non trained technician intervenes or if replaced spare parts and consumables do not come from an ABX approved origin.

1.2. Daily customer maintenance

No special adjustment or maintenance has to be done on your equipment if the recommended startup and shutdown procedures are explicitly respected.
See User’s manual for daily rinsing and cleaning of the system.

1.3. Weekly customer maintenance

An overall check for cleanliness of the system is recommended every week. All traces of blood or reagent have to be wiped off as soon as possible using a piece of cloth and distilled water.

Never use solvent or abrasive cleaning to clean the system.

1.4. Maintenance table

Pentra 80 maintenance is scheduled on 3 different maintenance kits. The maintenance schedule depends on the number of cycles per day, follow the chart table to know kit part number to be used.

Table 1: Maintenance table

Cycles per day	<30		30 to 120				>120		Kit P/n
Maintenance each	1y.	2y.	6m.	1y.	18m.	2y.	6m.	1y.	
Needle O’ring	X	X	X	X	X	X	X	X	XEA710AS Procedure: RAS325
Reagent syringe R’ring	X	X	X	X	X	X	X	X	
Draining and Counting syringes O’ring	X	X	X	X	X	X	X	X	
Sampling syringe	X	X		X		X	X	X	XEA486AS Procedure: RAS326
5DIFF syringe	X	X		X		X	X	X	
Draining syringe	X	X		X		X	X	X	
Optical bench lamp	X	X		X		X	X	X	
LMNE flowcell coaxial	X	X		X		X	X	X	
Diluent tank joint	X	X		X		X	X	X	
Counting heads	X	X		X		X	X	X	
Sampling probe replacement		X				X		X	XEA711AS Procedure: RAS327
Reagent pistons replacement		X				X		X	
Counting and draining syringe pistons replacement		X				X		X	

2. Maintenance kits

2.1. 6 month maintenance kit

Table 2: 6 Month maintenance kit XEA710AS

P/N	Designation	Qty
FAA013A	O’ring 1.80x1.20 Nitrile (Rinsing block)	1
FAA054A	O’ring 0.74x1.02 Fluocarbon (Rinsing block)	2
FAA057A	O’ring 5x1 Nitrile (Rinsing block)	1
FAA065A	O’ring 6.30x2.40 Silicon (Reagent syringe)	1
XDA621A	O’ring 30.80x3.60 + washer (counting + draining syringe 1 & 2)	3
XDA622A	O’ring 15.54x2.62 + washer (Reagent syringe)	4
XEA019A	Silicon grease	1

2.2. Yearly maintenance kit

Table 3: Yearly maintenance kit XEA486AS

P/N	Designation	Qty
DAJ007A	Optical bench lamp	1
FAA040A	O’ring 12.1x2.7 5DIFF syringe	1
FAA046A	O’ring 2.75x1.6 Coaxial cable	2
FAA064A	O’ring 14.2x1.52 Sampling syringe	2
FAA066A	O’ring 13.1x1.6 Draining chambers	4
FAA067A	O’ring 2.4x1.9 5DIFF syringe	4
GBG156A	Counting head EPO joint (Aperture)	4
XEA663A	LMNE flowcell coaxial kit	1
XEA286AS	Waste chamber washer + joint	1

2.3. Pistons maintenance kit

Table 4: Piston & Needle kit XEA711AS

P/N	Designation	Qty
GBC030A	Piston	4
GBC031A	Piston	1
GBG052A	Piston D=31 (Counting and draining syringes)	3
GBG169A	Percutor	1
GBG170A	Rinsing block O’ring thightener	1
XDA655AS	Sampling probe	1

2.4. Fitting kit

XEA311 kit includes most common pneumatic and hydraulic parts.

Table 5: Fitting kit XEA311

P/N	Designation	Qty
EAA005A	Straight connector ø1.6mm 1/8	10
EAA006A	Straight connector	10
EAA009A	Bent connector l=1.5 10/32	10
EAA013A	Bent connector 1/8	10
EAA014A	Straight connector 1/8	10
EAB002A	«L» connector	10
EAB003A	Connector ø4mm H19.5	20
EAB005A	«T» connector ø1.6mm T10-6	30
EAB006A	«T» connector ø2.3mm	30
EAB009A	Straight connector ø1.6mm	30
EAB010A	Straight connector ø2.3mm	30
EAB014A	Straight connector «Y» ø1.5mm/1.5mm	10
EAB021A	«Y» connector ø3mm	3
EAB026A	«Y» connector ø2.5mm	3
EAB035A	«T» connector ø2.3mm T220-6	10

2.5. Screws kit

XEA293 kit includes most common screws used in Pentra 80.

Table 6: Screws kit XEA293

P/N	Designation	Qty
KAA002A	CHC M3x6 Screw	20
KAA003A	CHC M3x8 Screw	20
KAA005A	CHC M3x12 Screw	20
KAA006A	CHC M3x14 Screw	20
KAA009A	CHC M3x20 Screw	20
KAA011A	CHC M3x30 Screw	20
KAA015A	CHC M4x8 Screw	20
KAA016A	CHC M4x12 Screw	20
KAA017A	CHC M4x16 Screw	20
KAA021A	CHC M5x10 Screw	20
KAA028A	CHC M4x20 Screw	20
KAB002A	FHC M3x6 Screw	20
KAB003A	FHC M3x8 Screw	5
KAB004A	FHC M3x10 Screw	20
KAB005A	FHC M3x12 Screw	20
KAB016A	FX M3x8 Screw	5
KAC002A	TC M3x5 Screw	20
KAE003A	BHC M4x12 Screw	20
KAH001A	HU M3 Nut	20
KAH002A	HU M4 Nut	20
KAH003A	HU M5 Nut	20
KAH024A	Nut 1/4-28 (US Std)	10
KAJ001A	M Washer ø3	20

Table 6: Screws kit XEA293

P/N	Designation	Qty
KAJ002A	M Washer ø4	20
KAJ003A	M Washer ø5	20
KAJ007A	AZ Washer ø3	20
KAJ008A	AZ Washer ø4	20
KAJ009A	AZ Washer ø5	20
KAJ010A	W Grower Washer ø5	20
KAM002A	Plastic Crosspiece M3x6 Lg.8	10
KAM003A	Plastic Crosspiece M4x6 Lg.8	10
KAM004A	Plastic Crosspiece M3.5x6 Lg.6	10
KAM005A	Plastic Crosspiece M3.5x6 Lg.8	10
KAM006A	Plastic Crosspiece M3.5x6 Lg.12	10
KAM010A	Plastic Crosspiece M3x6 Lg.10	10
KAM011A	Plastic Crosspiece M3.5x6 Lg.5.7	10
KAM013A	Plastic Crosspiece M3.5x6 Lg.10	10
KAM017A	Brass Crosspiece M3.5x6 Lg.3	10

3. Maintenance procedures

Maintenance and adjustments required for Pentra 80 are divided into procedures according to the concerned assemblies. This should make any update easier as all interventions can be done with the corresponding procedure on its own.
Each procedure has to be read entirely before starting intervention.

Procedures must be performed on a clean instrument.
If the instrument is suspected not to be perfectly clean, perform a concentrated cleaning.
Disposable gloves should be worn.

3.1. Required tools and products

Table 7: Tools and products

Tools\Product Designation	P/n
Barflex	
Clamps	
Cutting pliers	
Distilled water	
Dynamometric screwdriver A300	MAG013A
Dynamometric screwdriver A301	MAG020A
Dynamometric screwdriver A302	MAG019A
Empty sample tubes	
Felt pen	
Flat screwdriver	
Grease for mechanical assemblies	XEA381AS
Hexagonal keys	
RBC Latex	LAD002AS
Liquid soap	

Table 7: Tools and products

Tools\Product Designation	P/n
Micropipette tip	
Pair of scisors	
Scalpel	
Silicon grease	LAM004A
Soft tissue	
Syringe 5ml	
Thermometer	
Torx keyx	
Voltmeter	

3.2. Procedure chart table

Table 8: Procedure chart table

Procedure P/n	Procedure Designation	Concerns
RAS324	Installation	Unpacking - Working conditions - Instrument installation - First start of the instrument
RAS325	6 month maintenance	Rinsing block - Reagent syringe - Draining syringe 1&2 - Counting syringe - Filter
RAS326	Yearly maintenance	Sampling syringe O'ring - 5DIFF syringe O'ring - Draining chambers O'ring - Optical bench lamp and coaxe - Diluent reservoir - Counting chambers
RAS327	Piston & Needle kit replacement	Sampling probe & guide replacement - Draining syringe 1&2 - Counting syringe - Reagent syringe
RAS328	Decontamination & Rinse	Instrument decontamination & Rinse
RAS329	Chambers adjustment	Chambers assembly position check and adjustment
RAS330	Probe adjustment	Check and adjustment of the MDSS
RAS331	Main board adjustment	Hgb blank adjustment - RBC\Plt gain adjustment - WBC\Baso gain adjustment - Drain sensors adjustment - Motor current adjustment - Thresholds adjustment
RAS332	Motor board adjustment	Motor board currents check and adjustment
RAS333	Temperature adjustment	Reagent heating coil and thermostatic compartment temperature adjustment
RAS334	Vacuum adjustment	Draining syringe vacuum check - Counting syringe vacuum check - Counting syringe vacuum adjustment
RAS335	Bubbling adjustment	Bubbling adjustment
RAS336	LMNE flowcell adjsutment	LMNE flowcell position adjustment
RAS337	LMNE balance adjustment	LMNE balance calibration and forced calibration
RAS338	Tube holder adjustment	Tube holder assembly replacement - Tube holder adjustments - Needle adjustment - Compatible tube list
RAS339	Power supply replacement	Dismantling and replacement of the power supply
RAS340	Check up after intervention	Check up and control of instrument accuracy: Reapetability, Calibration, Control
RAS341	Optical bench dismantling & replacement	Optical bench dismantling, replacement and control

Table 8: Procedure chart table

Procedure P/n	Procedure Designation	Concerns
RAS342	Front panel & Covers dismantling	Dismantling of all instrument’s panels and covers
RAS343	Internal barcode reader adjustment	Adjustment of external barcode
RAS344	External barcode reader configuration	Adjustment of internal barcode
RAS345	Heater assy replacement	Replacement of the reagent heating system
RAS346	Mixer replacement	Replacement of the mixer
RAS347	Automatic sampler	Loading mechanism check and adjustment - Mixer mechanism check and adjustment - Transfer mechanism check and adjustment
RAS348	Internal PC replacement	Replacement of the computer
RAS349	PC hard disk replacement	Replacement of computer’s hard disk
RAS350	PC mother board replacement	Replacement and setup of the computer’s mother board
RAS351	PC floppy drive replacement	Replacement of the computer’s floppy disk drive
RAS352	PC CD-ROM drive replacement	Replacement of the computer’s CD-ROM drive
RAS353	PC touch screen replacement	Replacement of the computer’s touch screen
RAS354	Instrument main board replacement	Replacement of the instrument’s main board
RAS355	Motor board replacement	Replacement of the motor board
RAS356	Sensors check & adjustment	Check and adjustment of the instrument’s switches
RAS357	Save and restore settings	Save and restore analyser and workstation settings

MDSS Technology pentra 80

Installation Procedure

RAS324AA

- Concerns
    - Working conditions
    - Instrument installation
    - First start of the instrument
- Required tools

  None

- Required products

  None

- Intervention time

  1 hour

- Frequency

  On request

- Specific kit or consumables

  Installation kit: XEA709A

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Working conditions

1.1. Environment

The Pentra 80 should be operated in an indoor location only. Operation at an altitude over 3000 meters (9800 feet) is not recommended. Instrument is designed to be safe for transient voltages according to INSTALLATION CATEGORY II and POLLUTION DEGREE 2.

Please ask your *ABX Diagnostics* representative service center for any information about the operating location when it does not comply with the recommended specifications.

1.2. Location

The Pentra 80 should be placed on a clean and leveled table or work station. Please note that the Pentra 80, printer and reagents weigh approximately 40 kilograms (88 lbs). Avoid exposure to sunlight. Proper ventilation requires that a space of at least 20 cm (8 inches) must be left behind the instrument.

1.3. Grounding

Proper grounding is required. Check that the wall ground (earth) plug is correctly connected to the laboratory grounding electricity installation.

If there is no ground then use a ground stake. Current electricity Standards must be applied.

1.4. Humidity and temperature conditions

The Pentra 80 must function between 16 to 34°C (61 to 93°F). Maximum relative humidity 80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F). If it is kept at a temperature of less than 10°C (50°F), the instrument should be allowed to sit for an hour at the correct room temperature before use.

1.5. Electromagnetic environment check

The Pentra 80 as been designed to produce less than the required level of electromagnetic interferences in order to operate in conformity with its destination. The electromagnetic interferences caused by the Pentra 80 are limited to a level allowing the correct operation of other instruments in conformity with their destination.

In case of problems, check that the instrument is not placed in proximity of electromagnetic fields, or short wave emissions (radars, X-rays, scanner, etc...).

1.6. Environment protection

Used accessories and consumables must be collected by a laboratory specialized in elimination and recycling of this kind of material according to the legislation.

2. Instrument Installation

2.1. Unpacking

Unpack the instrument carefully.

After unpacking check that all of the parts from the package list are present.

Table 1: Package list

Part Number	Qty	Designation
XEA709A	1	Installation kit Pentra 80
HAX0023	1	Rack label type 1 - 1 to 20
HAX0024	1	Rack label type 2 - 1 to 20
XBA453A	1	Barcode reader
GBL072A	4	Lifting handles
GBL0123	10	Rack 10 vials 13x82
XBA322B	1	Waste sensor
CBK044A	1	Computer Mouse
GBL0250	1	Keyboard drawer

Table 2: Installation Kit XEA709A

Part Number	Qty	Designation
DBE019A	2	Wire guide
DBH001A	3	Tyrap LA=2,4 L=92
DBH002A	3	Tyrap LA=3,6 L=140
DBK003A	1	Adhesive support
DBK009A	1	Adhesive support
EAB021A	1	«Y» connector Diam.=3mm
EAB026A	1	«Y» connector Diam.=2,5mm
EAB033A	1	«T» connector ø1,6mm T410-6
EAB035A	1	«T» connector ø2,3mm T220-6
EAC010A	2	Female luer connector l=3
EAC019A	1	Male luer connector l=3
EAE005A	2m	Tygon tube ø1,02mm (0,040”)
EAE006A	2m	Tygon tube ø1,295mm (0,051”)
EAE007A	2m	Tygon tube ø1,52mm (0,060”)
EAE008A	2m	Tygon tube ø2,06mm (0,081”)
EAE011A	2m	Cristal tube 3x6
EAE028A	2m	Cristal tube 4x6
EAE034A	2m	Tygon tube ø2,54mm (0.100”)
EBB059AS	1	Filter support
FAA013A	1	O’ring 1,8x1,2
FAA054A	2	O’ring 0,74x1.02 fluocarbon
FAA057A	1	O’ring 5x1
FBH018A	1	Housse Pentra 80
FBL001A	1	Rubber cap 2 holes
GAK302A	3	Bottle cap
GBG138A	1	1/4 turn door key
GBG145A	1	Reagent straw stopper ø20
GBG155A	1	Capsule ø25
GBG156A	2	Counting head flat joint
GBG245A	3	Reagent straw stopper ø28
MAB002A	1	Allen bent key 2,5mm
MAB003A	1	Allen bent key 1,5mm

Table 2: Installation Kit XEA709A

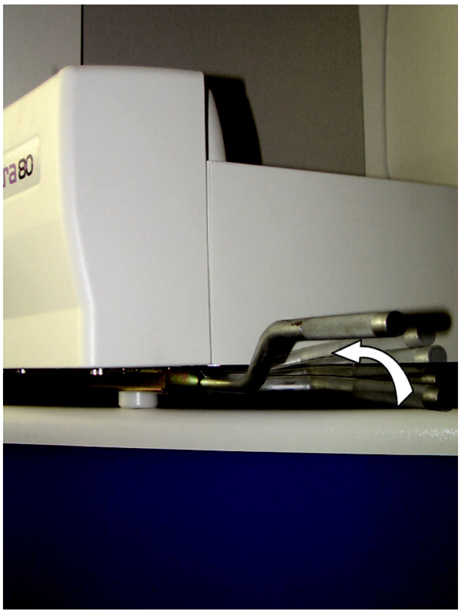
Part Number	Qty	Designation
MAB018A	1	Allen bent key 3mm
MAB090A	1	Torx bent key T10
XDA483B	1	3V liquid valve (without self)
XDA621A	1	O’ring 30,8x3,8 + Washer
XDA655AS	1	Sampling probe
XDA692A	1	Diluent input tubing
XEA018A	1	Diluent straw Lg=360mm
XEA019A	1	Grease
XEA322B	1	Waste straw

2.2. Transport and installation

To operate the instrument correctly, install it in a place satisfaying the following conditions:

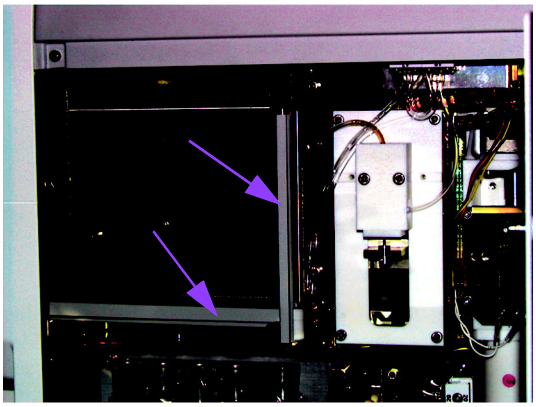
- Place where the instrumentPlace where the instrument and reagents are not thermally affected by direct sunlight and intense radiant heat.
- Place where it is not exposed to water or vapor.
- Place where it is flat and free from vibration or shock.
- Place where an independent power receptacle can be used.
- Use a receptacle different from the one used by a device that easily generate noise such as a centrifuge, etc...
- Provide a space of at least 10 cm at the back of the instrument for arranging the power cable and pipes.

⚠ Install instrument lifting handles in their location (See “Lifting handles installation”, page 5), make sure they are correctly secured, lift the instrument using the four handles up on to the installation bench.



Diag.1: Lifting handles installation

Open the thermic panel (righthand side of the instrument).
Remove the plastic rails retaining the carriage (See “Plastic rails”, page 5).



Diag.2:Plastic rails

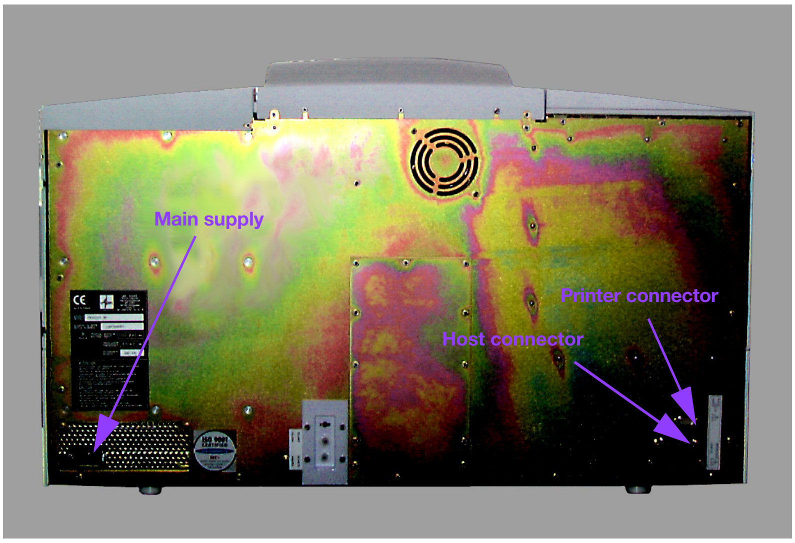
2.3. Electrical & Computer connections

Check that the power supply module voltage of the instrument corresponds to the nominal voltage supply of the laboratory and the country.

Connect the power supply cable (See "Electrical connections", page 6)

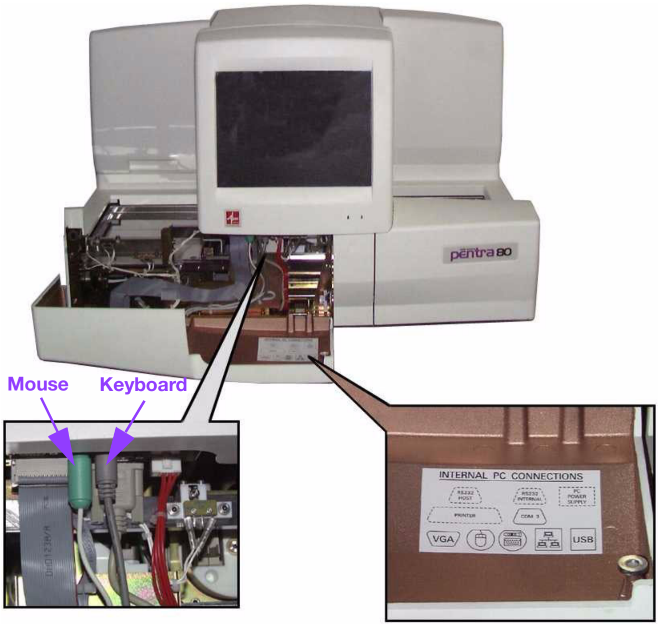
Connect the printer (See "Electrical connections", page 6)

Power requirements:
Analyzer: 250W
Printer (EPL 5900): 850W


Main supply
Printer connector
Host connector

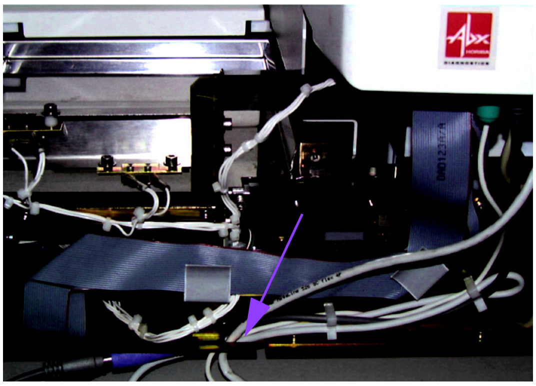
Diag.3:Electrical connections

Connect computer's devices: Mouse, Keyboard, Barcode reader (See "Computer's connections", page 6).


pentra 80
Mouse
Keyboard
INTERNAL PC CONNECTIONS
RS232 HOST
RS232 INTERNAL
PC POWER SUPPLY
PRINTER
COM 3
VGA
USB

Diag.4:Computer's connections

Route the computer's wiring under the frame of the Pentra 80 (See "Computer's wiring", page 7).



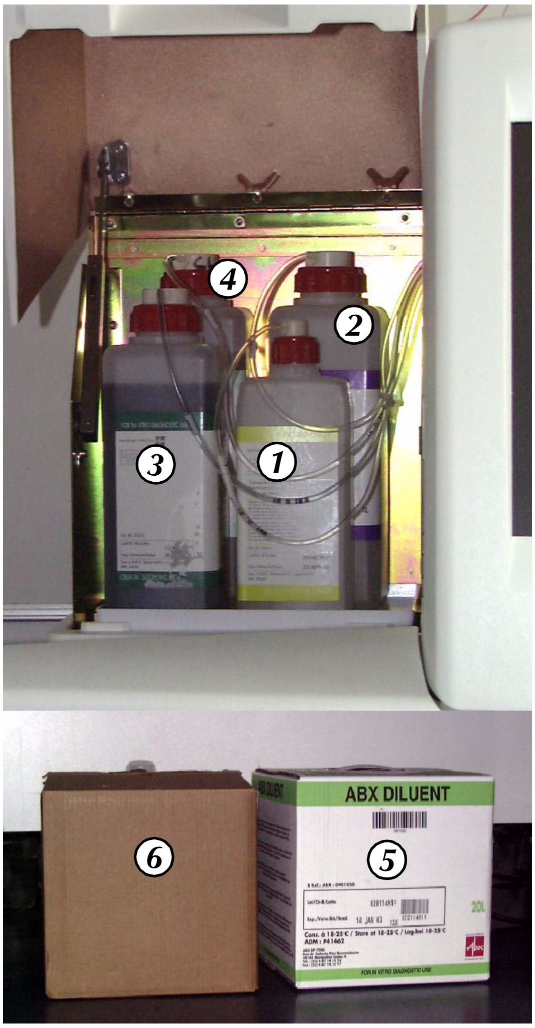
Diag.5:Computer's wiring

2.4. Reagents installation

Use «Luer» connectors, straws and stoppers supplied with the installation kit to connect integrated reagents, diluent and wastes.

Bottles and container locations (See "Reagent location", page 8):

1- ABX Alphalyse
2- ABX Basolyse II
3- ABX Eosinofix
4- ABX Cleaner
5- ABX Diluent
6- Waste container



Diag.6:Reagent location

Risk of erroneous results if diluent container is installed further than 80 cm (31,5 in.) bellow the instrument.

Diluent input tubing: Cristal 3x6 / 2 meters (80 in.) maximum
Waste output tubing: Cristal 4x6 / 2 meters (80 in.) maximum

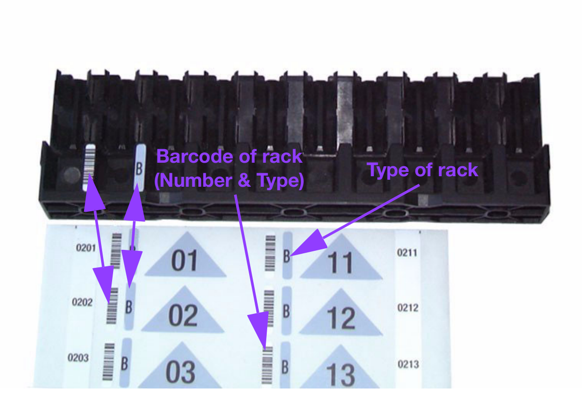
3. First start of the instrument

Start the instrument (ON\OFF Switch is on the righthand side of the instrument).
Wait for computer's initialization. When logon window is opened: Log as «administrator», password «XXXXX» (Beware to the type of the keyboard used: Qwerty or Azerty).

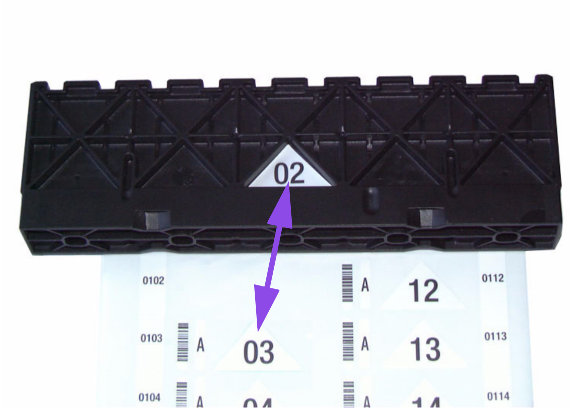
When Pentra 80 is started it initializes its mechanical components, wait until the end of the initialization.

3.1. Racks

The Pentra 80 racks are identified by means of barcode labels. Prepare 2 or 3 racks to use during installation. These labels have to be placed on racks as follows:


Barcode of rack
(Number & Type)
Type of rack
0201
01
0202
02
0203
03
B
11
12
13
0211
0212
0213

Diag.7:Rack's labels front side


02
0102
0103
03
0104
A
12
13
0112
0113
0114

Diag.8:Rack's labels rear side

3.2. Check keyboard setup

Check the type of the keyboard used (Qwerty or Azerty). From window **Input Locales**, menu: **Settings\System\Local Settings**, press **Edit** button then **Change Input Locales** button.

3.3. Check Date\Time

Check and if necessary adjust Date and Time. From window **Date/Time**, menu: **Settings\System\Local Settings**, press **Edit** button then **Change Date/Time** button.

Adjust Date & Time then press **Validate** button to save changes.

3.4. Check printer configuration

Check the printer used by the system is correctly defined.

Enter menu: **Settings\System\Printer**, press **Edit** button then **Printer Properties** button.

Check the name of the printer used in the **Name** field of the **Print** window. If necessary select the right printer then press **Validate** button.

3.5. Prime reagents

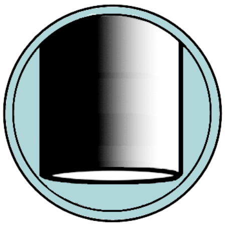
Prime reagent using barcode reader to enter lot number and to update expiry date automatically, menu: **Status**.

Run a whole priming of all reagents to be sure of a correct priming, menu: **Service\Super User\Hydraulical\Prime cycles\All reagents**.

3.6. Mechanic check

Make sure all the panels are fitted on the instrument.
Check in menu: **Service\Super User\Mechanical\Check Sensors**, that all the sensors are green.
Check rack is well transfered to the reception tray, menu: **Service\Technician\Gains\Sampler adjust**. then press **Check Rack Transfer Moving**.

Check MDSS is correctly adjsuted, menu: **Service\Technician\Gains\M.D.S.S. Adjustment**, press **Check Needle Position**. The probe muste be as shown:



Diag.9:MDSS Adjustment

Check Hgb blank value, menu: **Service\Technician\Measurement\Gain Adjustment**, press **Hgb Blank Adjsutment**. If necessary adjsut between ground and **TP1** with **R248** potentiometer on main board, the Hgb blank voltage to **4.7V ±0.02V**.

3.7. Startup

Run a Startup cycle.

3.8. Repeatability

Check repeatablility running 10 analyses with on the same blood sample.
From menu: **Quality Assurance\Within Run**, run 10 consecutive analyses.

3.9. Calibration

Perform a calibration of the instrument. Select and enter Calibrator lot parameters. If necessary force calibration to enter the new coefficients.

3.10. Control

Run several controls to validate the calibration. When using DIFFTROL control blood, use the floppy disk to update lot parameters.
Select the **Reserved** box to link the lot number to QC results for further analyses.

3.11. Config. save

After installation is completed archive instrument setup by following procedure RAS357 «Save and restore settings».

MDSS Technology pentra 80

6 month maintenance

RAS325AA

HORIBA
DIAGNOSTICS

Concerns

- Rinsing block
- Reagent syringe
- Draining syringe 1
- Draining syringe 2
- Counting syringe
- Filter

Required tools

- Hexagonal Keys
- Dynamometric screw drivers A302, A301, A300
- Cutting pliers
- Flat screw driver
- Philips screw drivers
- Torx keys

Required products

Minoclair

Intervention time

2 h.

Frequency

See maintenance table

Specific kit or consumables

6 month spare parts maintenance kit: XEA710AS

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Table 1: 6 Month maintenance kit XEA710AS

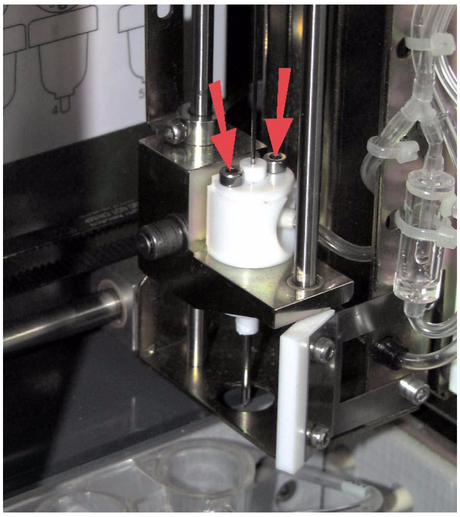
P/N	Designation	Qty
FAA013A	O’ring 1.80x1.20 Nitrile (Rinsing block)	1
FAA054A	O’ring 0.74x1.02 Fluocarbon (Rinsing block)	2
FAA057A	O’ring 5x1 Nitrile (Rinsing block)	1
FAA065A	O’ring 6.30x2.40 Silicon (Reagent syringe)	1
XDA621A	O’ring 30.80x3.60 + washer (counting + draining syringe 1 & 2)	3
XDA622A	O’ring 15.54x2.62 + washer (Reagent syringe)	4
XEA019A	Silicon grease	1

This procedure must be performed on a clean instrument.If the instrument is suspected not to be perfectly clean, perform a concentrated cleaning.
Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all operations.

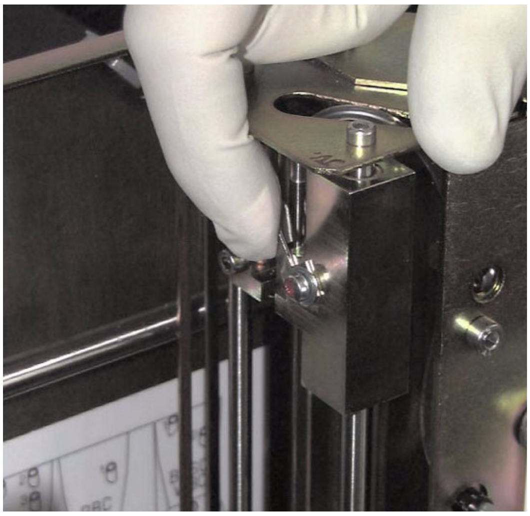
1. Rinsing block

O’ ring replacement (1xFAA013A, 2xFAA054A & 1xFAA057A).

Switch off the instrument and disconnect power supply cable.
Open the right side door.
Move the carriage to access to the rinsing block.
Remove the 2 rinsing block screws (See Diag.1“rinsing block.”, page 2).
Lift the locker (See Diag.2“locker.”, page 3) to free the probe and remove the rinsing block.

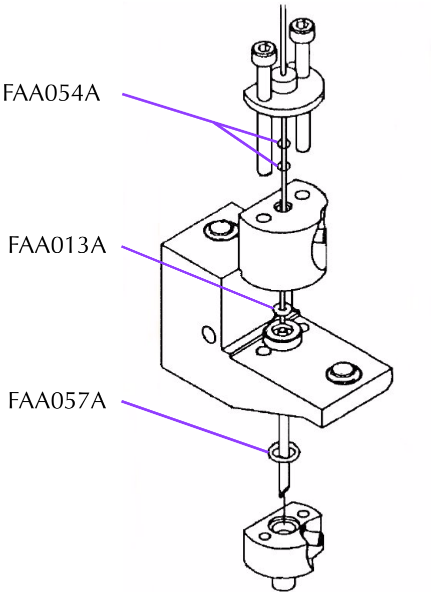


Diag.1 rinsing block.



Diag.2 locker.

Use a small amount silicon grease with FAA057A O'ring (See Diag.3"O'ring position.", page 3) and replace the O'rings from the rinsing block



Diag.3 O'ring position.

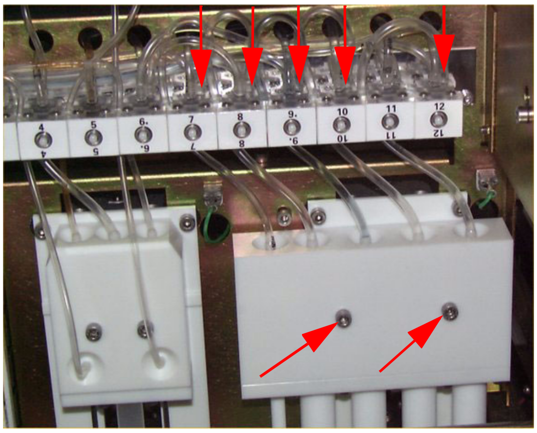
Reassemble in reverse order.

⚠ Do not tight too much the rinsing block screws.

2. Reagent syringes

O'ring replacement (1xFAA065A& 4xXDA622A).

Switch off the instrument and disconnect power supply cable.
Remove cover (See RAS342 procedure).
Disconnect the following tubes: (See Diag.4"Reagent syringe", page 4).



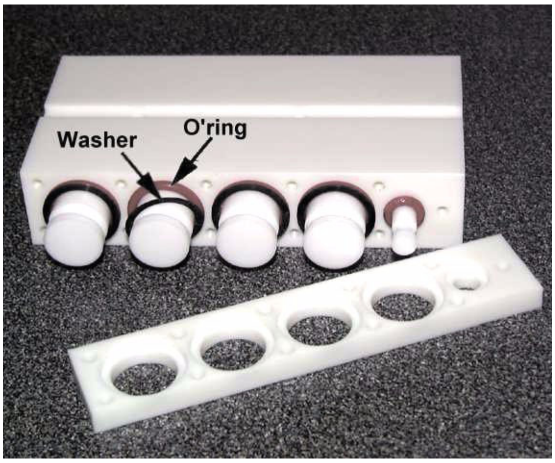
- valve 7 inlet 3.
- valve 8 inlet 3.
- valve 9 inlet 3.
- valve 10 inlet 3.
- valve 12 inlet 3.

Diag.4 Reagent syringe

Unscrew the 2 fixation screws and remove carefully the reagent syringes (See Diag.4“Reagent syringe”, page 4).
Push several times the piston over the waste container to drain the syringes.

The thickness of the washer is matched to each O’ring thickness.For this reason, keep the O’ring and the washer together.
Lyse piston O’ring (small one) had no washer.

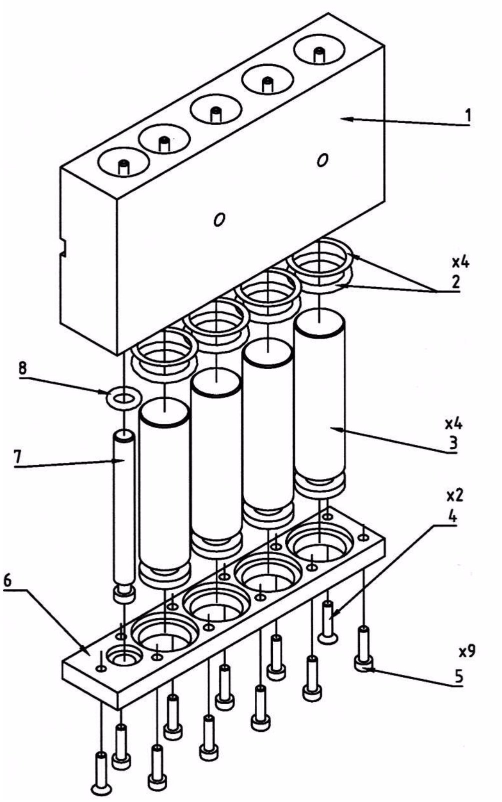
On a piece of absorbant paper open the reagents syringe (9x CHC M3x12 screws, 2x FX M3x12 screws).
Replace all O’rings and washers by new one from the 6 month maintenance kit.
Use one drop silicon grease in between 2 fingers to lubricate the O’rings (See Diag.5“Reagent syringe open.”, page 4).



Diag.5 Reagent syringe open.

TIGHTENNING TORQUES
9x CHC M3x12 :
400mN.m (56.8Ozf.in)
2x FX M3x12 :
400mN.m (56.8Ozf.in)

Reassemble in reverse order.
Use a dynamometric screw driver to tighten the syringe (See Diag.6“Reagent syringe view.”, page 5).



- 1_ Reagent syringe body (GBG033a).
- 2_XDA622A.
- 3_Piston (GBC030A).
- 4_FX M3x12 screws.
- 5_CHC M3x12 screws.
- 6_Reagent syringe bottom plate (GBG034A).
- 7_Hgb lyse reagent piston (GBC031A).
- 8_O'ring (FAA065A).

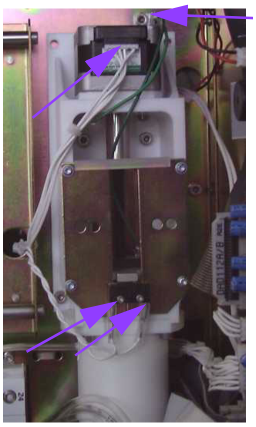
Diag.6 Reagent syringe view.

XDA622A = O'ring (FAA063A) + Washer (GBG149A).

3. Draining & counting syringes

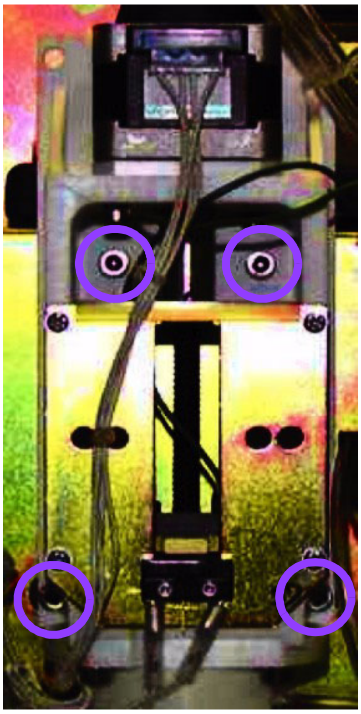
O' ring replacement on draining syringe 1.

Switch off the instrument and disconnect power supply cable.
Remove cover (See RAS342 procedure).
Disconnect electrical connectors on the syringe (See Diag.7"Draining 1 syringe electrical connections.", page 5).



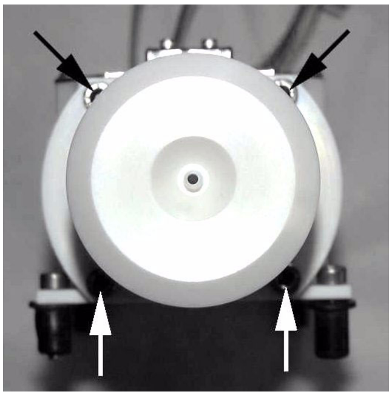
Diag.7 Draining 1 syringe electrical connections.

Unscrew the 4 syringe screws, just few turns to free silent block (CHC M4x16).
See Diag.8"Draining 1 syringe screws.", page 6.



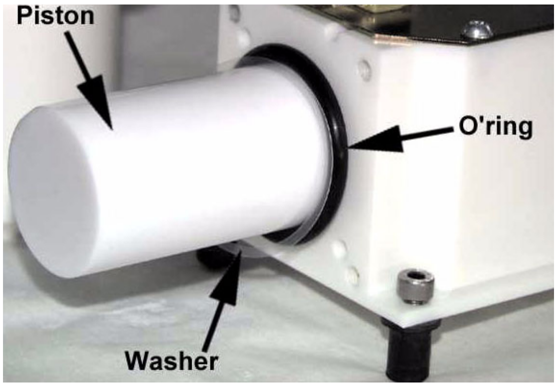
Diag.8 Draining 1 syringe screws.

Put a piece of absorbant paper under the syringe and disconnect all the tubes from the syringe.
Remove the syringe.
Drain the syringe pushing the piston nut up and down several times.
Open the syringe (4x CHC M4x16 screws)
See Diag.9"Draining 1 syringe screws.", page 6.



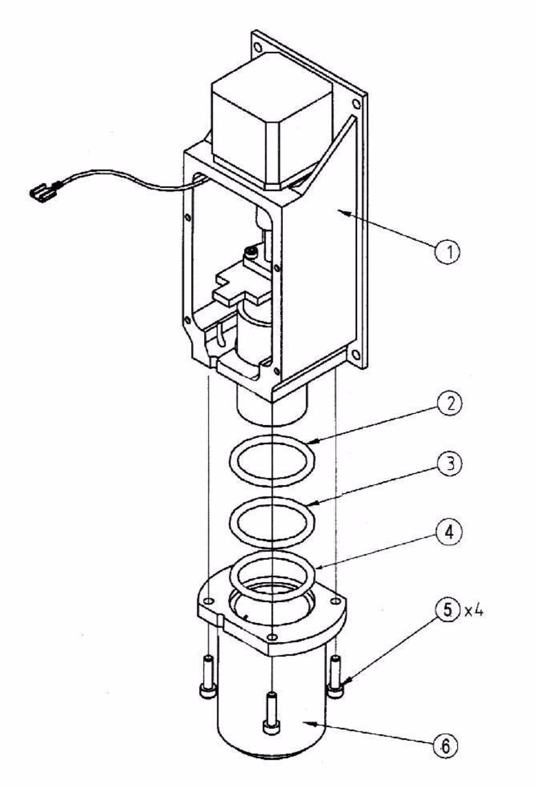
Diag.9 Draining 1 syringe screws.

Replace the O'ring by the new one from the 6 month maintenance kit.
Use one drop silicon grease in between 2 fingers to lubricate O'ring and piston.
See Diag.10"Draining 1 syringe open.", page 7.



Diag.10 Draining 1 syringe open.

Reassemble in reverse order (See Diag.11“Draining 1 syringe view.”, page 7).



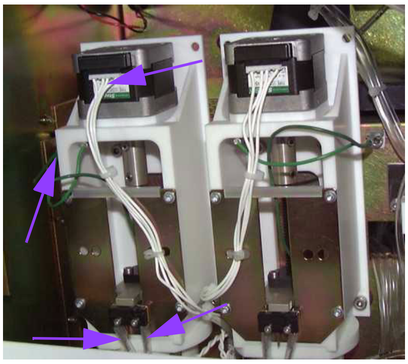
- 1_Motor assembly.
- 2_O’ring (FAA017A).
- 3_Anti-extrusion ring(GBG219A).
- 4_Washer (GBG148A).
- 5_CHC M4x16 screws.
- 6_Syringe body.

Diag.11 Draining 1 syringe view.

O’ring (FAA017A) + Washer (GBG148A) = XDA621A.

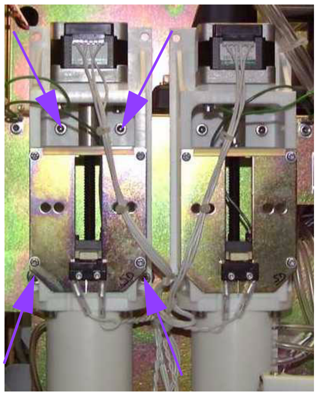
O’ ring replacement on draining syringe 2.

Switch off the instrument and disconnect power supply cable.
Remove cover (See RAS342 procedure).
Disconnect electrical connectors on the syringe (See Diag.12“Draining 2 syringe electrical connections.”, page 8).



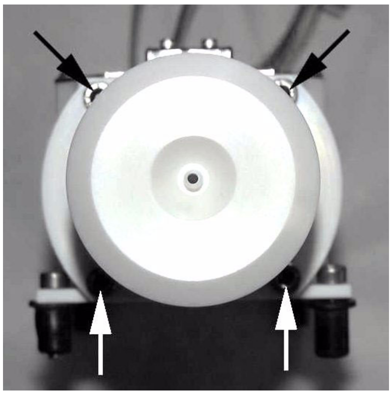
Diag.12 Draining 2 syringe electrical connections.

Unscrew the 4 syringe screws, just few turns to free silent block (CHC M4x16). See Diag.13“Draining 2 syringe screws.”, page 8.



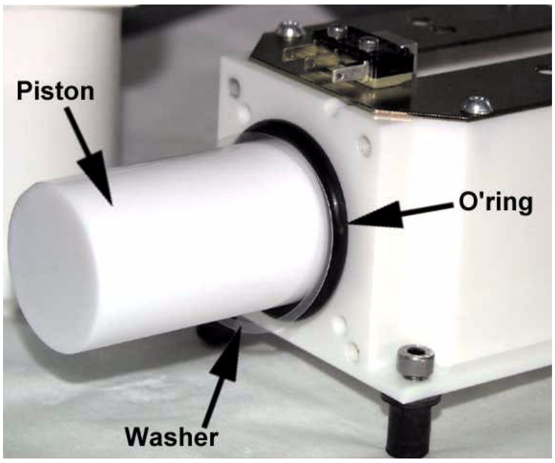
Diag.13 Draining 2 syringe screws.

Put a piece of absorbant paper under the syringe and disconnect all the tubes from the syringe.
Remove the syringe.
Drain the syringe pushing the piston nut up and down several times.
Open the syringe (4x CHC M4x16 screws). See Diag.14“Draining 2 syringe screws.”, page 8.



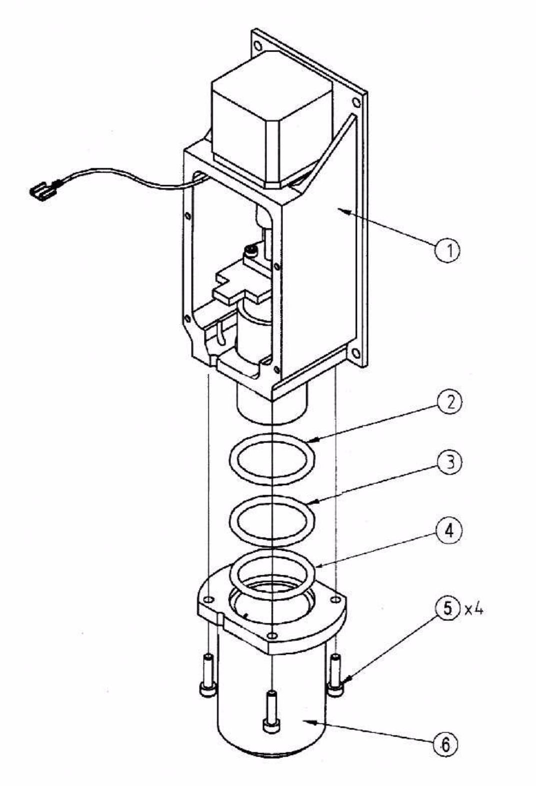
Diag.14 Draining 2 syringe screws.

Replace the O’ring by the new one from the 6 month maintenance kit.
Use one drop silicon grease in between 2 fingers to lubricate O’ring and piston.
See Diag.15“Draining 2 syringe open.”, page 9.



Diag.15 Draining 2 syringe open.

Reassemble in reverse order (See Diag.16“Draining 2 syringe view.”, page 9).



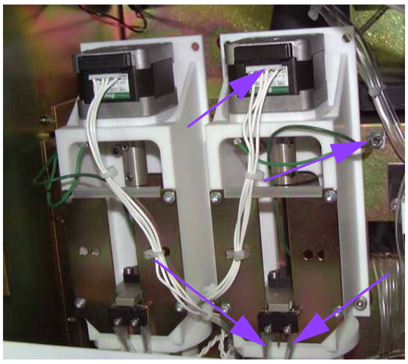
- 1_Motor assembly.
- 2_O’ring (FAA017A).
- 3_Anti-extrusion ring(GBG219A).
- 4_Washer (GBG148A).
- 5_CHC M4x16 screws.
- 6_Syringe body.

Diag.16 Draining 2 syringe view.

XDA621A = O’ring (FAA017A) + Washer (GBG148A).

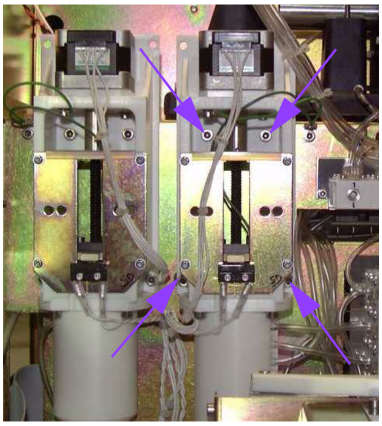
O’ ring replacement on counting syringe.

Switch off the instrument and disconnect power supply cable.
Remove cover (See RAS342 procedure).
Disconnect electrical connectors on the syringe (See Diag.17“Counting syringe electrical connections.”, page 10).



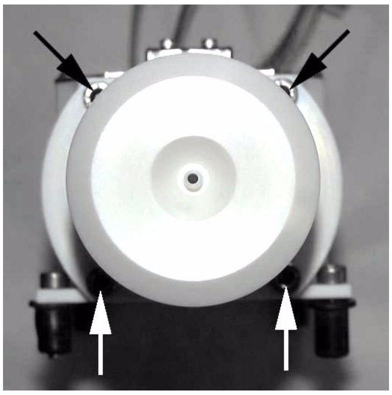
Diag.17 Counting syringe electrical connections.

Unscrew the 4 syringe screws (CHC M4x16), just few turns to free silent block (See Diag.18"Counting syringe screws.", page 10).



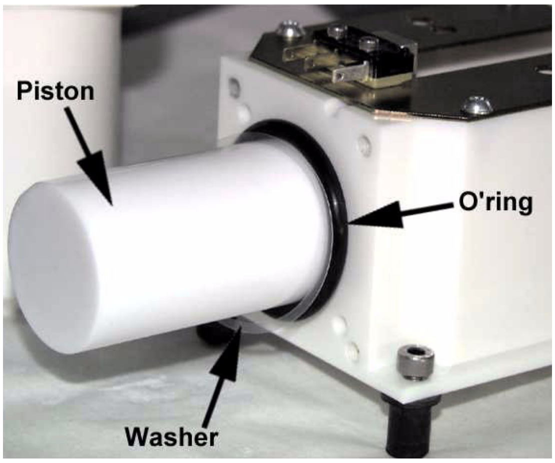
Diag.18 Counting syringe screws.

Put a piece of absorbant paper under the syringe and disconnect all the tubes from the syringe.
Remove the syringe.
Drain the syringe pushing the piston nut up and down several times.
Open the syringe (4x CHC M4x16 screws).See Diag.19"Counting syringe screws.", page 10.



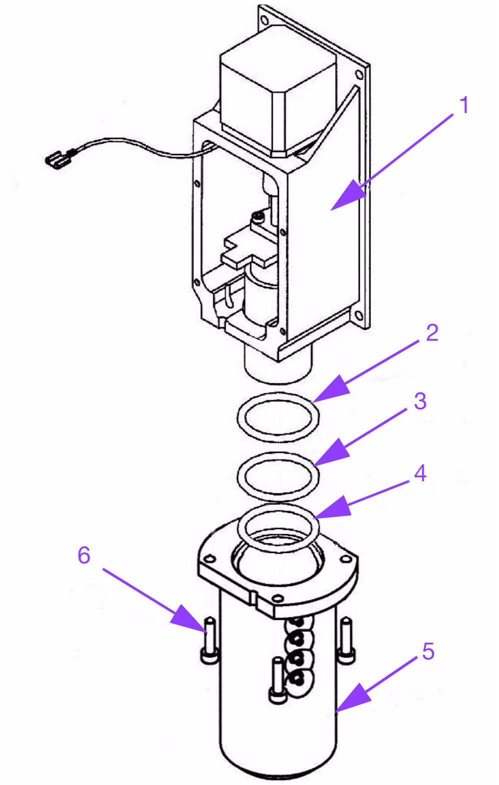
Diag.19 Counting syringe screws.

Replace the O'ring by the new one from the 6 month maintenance kit.
Use one drop silicon grease in between 2 fingers to lubricate O'ring and piston.(See Diag.20"Counting syringe open.", page 11).



Diag.20 Counting syringe open.

Reassemble in reverse order (See Diag.21“Counting syringe wiev.”, page 11).



- 1_Motor assembly
- 2_O’ring (FAA017A)
- 3_Anti-extrusion ring(GBG219A).
- 4_Washer (GBG148A).
- 5_Syringe body (GBG211A).
- 6_CHC M4x16 screws x4.

Diag.21 Counting syringe wiev.

O’ring (FAA017A) + Washer (GBG148A) = XDA621A.

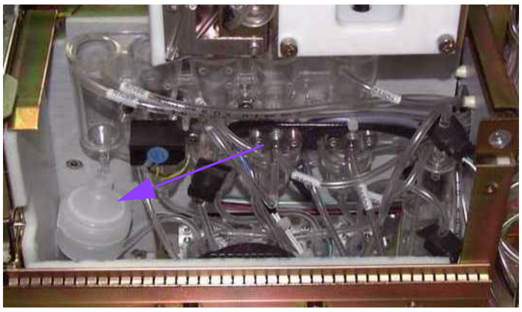
4. Instrument cleaning.

Concerned assemblies

All the thermostated compartment.
Outer surfaces of the instrument (perpex, covers, reagent locations....).
Waste connector plug.
Liquid valve push button.
Assemblies close to the needle.
Tube holder assembly.
Overflow trays.

Procedure

Dilute the 12°cl bleach to 1 part of bleach for 4 of deionize water (1/5).
Instrument environment must be cleaned.
No sponge, nor cloth must be used. Only absorbant paper, thrown after use in contamination bins, have to be used. For small or sensitive assemblies, use accurate drier papers.
All assemblies suspected to have been in contact with biohazardous material must be disinfected with diluted bleach (the stainless steel must be bleached below 30°Celsius).
Blood stains or salt marks must be cleaned with spray detergent first.
Clean the filter under the «rinse» chamber (See Diag.22“filter.”, page 12) from the pieces of cap rubber.



Diag.22 filter.

Reinstall all the assemblies and setup the instrument back to its initial configuration.

Yearly maintenance Procedure

RAS326AA

- Concerns

Pentra 80 maintenance
- Sampling syringe: O'ring replacement
- 5DIFF syringe: O'ring replacement
- Draining chambers: O'ring replacement
- Optical bench: Lamp & LMNE coaxial replacement
- Diluent reservoir
- Counting chambers

- Required tools

- Hexagonal keys
- Dynamometric screwdriver A302, A301, A300
- Cutting pliers
- Flat screwdriver
- Philips screw driver
- Tork keys

- Required products

Minoclair
RBC\Plt Latex

- Intervention time

2h.

- Frequency

See maintenance table

- Specific kit or consumables

Yearly spare part kit: XEA711AS

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Yearly maintenance kit

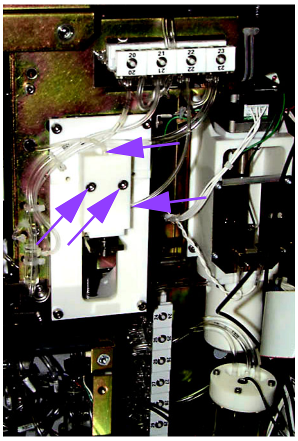
Table 1: Yearly maintenance kit XEA486AS

P/N	Designation	Qty
DAJ007A	Optical bench lamp	1
FAA040A	O'ring 12.1x2.7 5DIFF syringe	1
FAA046A	O'ring 2.75x1.6 Coaxial cable	2
FAA064A	O'ring 14.2x1.52 Sampling syringe	2
FAA066A	O'ring 13.1x1.6 Draining chambers	4
FAA067A	O'ring 2.4x1.9 5DIFF syringe	4
GBG156A	Counting head EPO joint (Aperture)	4
XEA663A	LMNE flowcell coaxial kit	1
XEA286AS	Waste chamber washer + joint	1

⚠ This procedure must be performed on a clean instrument. If the instrument is suspected not to be perfectly clean, perform a concentrated cleaning.

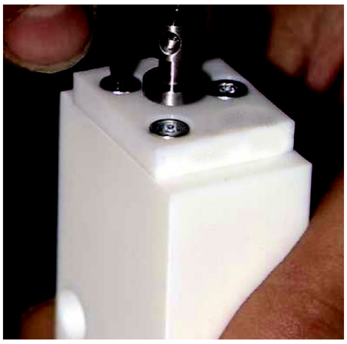
2. Sampling syringe O'ring replacement (2xFAA064A)

Switch the instrument off and disconnect power supply cable.
Open the righthand side door.
Move the carriage to access to the sampling syringe.
Disconnect the tubes from the sampling syringe and unscrew the 2 fixation screws (See Diag.1: "Sampling syringe dismantling", page 2).



Diag. 1:Sampling syringe dismantling

Open the syringe (Unscrew the 3 FX M3x12 screws See Diag.2: "Sampling syringe screws", page 3).



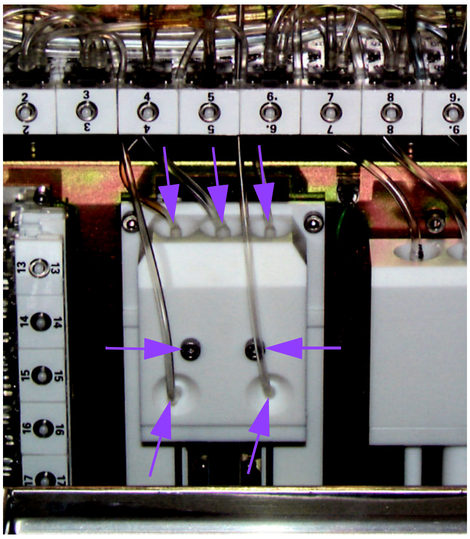
Diag.2:Sampling syringe screws

Replace both O'ring joints (Use one drop of silicon grease between 2 fingers to lubricate O'rings). Reassemble in reverse order, Sampling syringe screws tightening torque: 400 mN.m (56.8 Ozf.in).

3. 5DIFF syringe O'ring replacement (FAA040A & 4xFAA067A)

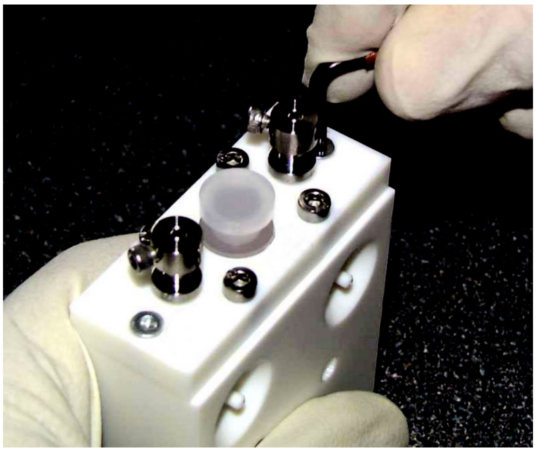
Open the lefthand side panel to access to the 5DIFF syringe.

Gently disconnect the tubes from the 5DIFF syringe and unscrew the 2 fixation screws (See Diag.3: "5DIFF syringe dismantling", page 3).



Diag.3:5DIFF syringe dismantling

Open the syringe (Unscrew the 2xFX M3x12 & the 4xCHC M3x12 screws See Diag.4: "5DIFF syringe screws", page 4).



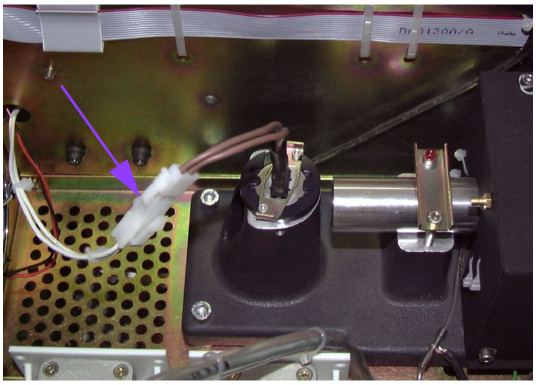
Diag.4:5DIFF syringe screws

Replace all the O'rings (Use one drop of silicon grease between 2 fingers to lubricate O'rings). Reassemble in reverse order, 5DIFF syringe tightening torque: 400 mN.m (56.8 Ozf.in).

4. Optical bench lamp replacement (DAJ007A)

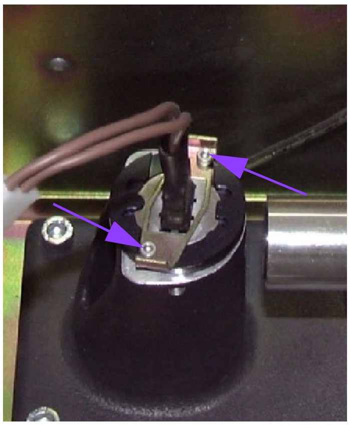
Before dismantling optical bench lamp make sure it is cold.
Do not touch lamp bulb with the fingers, use a piece of cloth or paper to manipulate the lamp.

Open the cover (see RAS342 Front panel & Covers dismantling procedure for further details). Disconnect the lamp supply (See Diag.5: "Optical bench lamp disconnection", page 4).



Diag.5:Optical bench lamp disconnection

Unscrew the lamp fixation screws for few turns to release the lamp (See Diag.6: "Optical bench lamp dismantling", page 5).

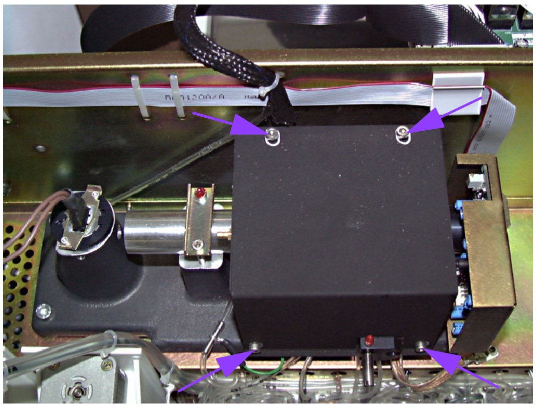


Diag.6:Optical bench lamp dismantling

Turn the lamp and remove it.
Change the lamp.
Put back the fixation systme and block the screws.
Reconnect the lamp supply.

5. LMNE flowcell coaxial replacement (XEA663A)

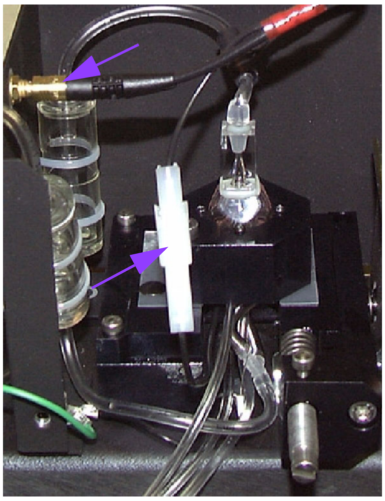
Open the optical bench cover (See Diag.7: “Optical bench cover dismantling”, page 5).



Diag.7:Optical bench cover dismantling

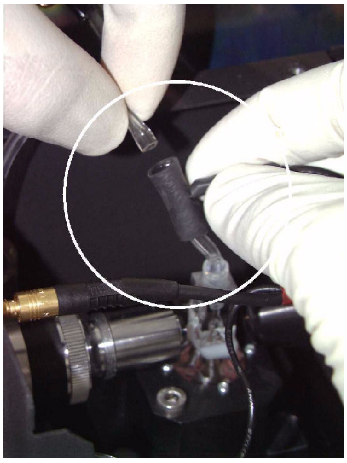
Disconnect coaxial connector from the Optical bench board (See Diag.8: “Coaxial disconnection”, page 6).

Disconnect the coaxial from the LMNE flowcell (See Diag.8: “Coaxial disconnection”, page 6).



Diag.8:Coaxial disconnection

Disconnect both tube from the «T» connector (few diluent drops may leak, See Diag.9: “«T» disconnection”, page 6)



Diag.9:«T» disconnection

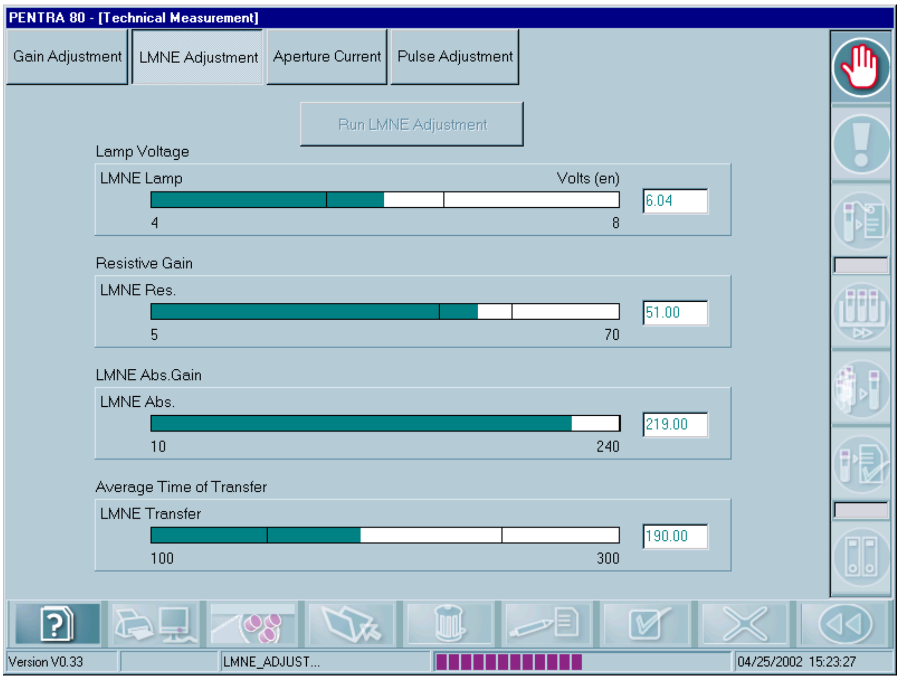
Replace the coaxial cable.

6. Optical bench lamp 6V voltage check

Run a **Rinse cytometer** cycle to get ride of air bubbles stuck to the inner optical surfaces.
From menu **Service\Menu Super User\Hydraulic\Clean cycle\Rinse cytometer** ().
Check that the flowcell contains no or just a very few air bubbles.
From menu **Service\Menu technician\Measurment\LMNE adjustment**
Click on **Run LMNE Adjustment** button.

⚠ Mix the RBC/PLT latex thorougly.

Closed tube holder when the message **Please sample LATEX** appears.


PENTRA 80 - [Technical Measurement]
Gain Adjustment
LMNE Adjustment
Aperture Current
Pulse Adjustment
Run LMNE Adjustment
Version V0.33
LMNE_ADJUST...
04/25/2002 15:23:27

Lamp Voltage
LMNE Lamp: 6.04 Volts (en) (4 to 8)

Resistive Gain
LMNE Res.: 51.00 (5 to 70)

LMNE Abs.Gain
LMNE Abs.: 219.00 (10 to 240)

Average Time of Transfer
LMNE Transfer: 190.00 (100 to 300)

Diag.10:LMNE lamp 6V adjsutment

Check LMNE lamp voltage is 6V±0.5V
Check as well the other values are within the acceptable range.

Table 2: optical bench adjustment target values

Parameter	Target	Range
LMNE LAMP	6V	±0.5V
TRANSFER TIME	200µs	±50µs
RESISTIVE CHANNEL	50	45 to 55
ABSORBANCE CHANNEL	170	set to maximum

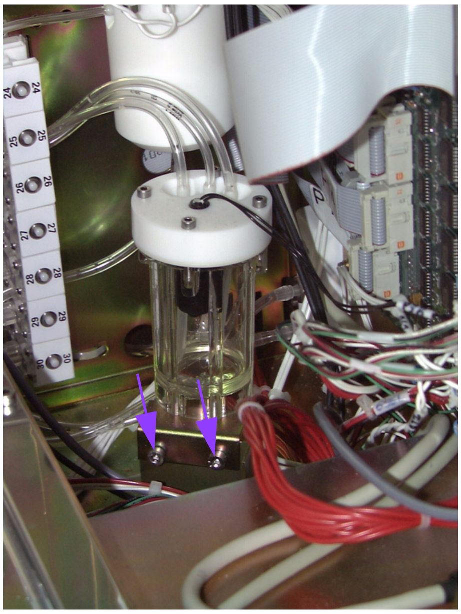
7. Diluent reservoir Joint & Washer replacement (XEA286AS)

From menu: **Services\Super User Menu\Hydraulic\Unprime Cycle** run the **All** option to drain the chambers and the diluent reservoir.

Remove the righthand side panel and the mother board cover from the instrument (See procedure RAS342 Front panel & Covers dismantling for further details).

Remove the white vertical plastic mother board protection.

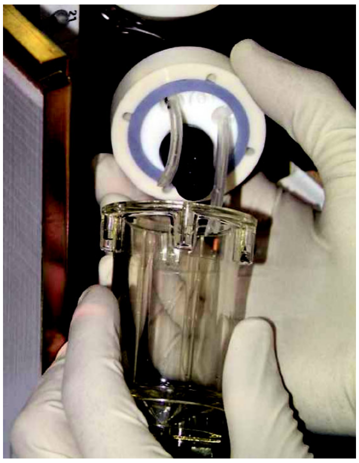
Loosen the 2 diluent reservoir fixation screws to free the diluent reservoir (See Diag.11: “Diluent reservoir dismantling”, page 8).



Diag.11:Diluent reservoir dismantling

Open the diluent reservoir without disconnecting its tubing (4 screws on the top).

Locate the new joint and washer against the reservoir top (See Diag.12: “Diluent reservoir assembling”, page 8).



Diag.12:Diluent reservoir assembling

⚠ Locate the top part of the reservoir to have the both tube turned in front of the diluent reservoir.
Top screws tightening torque: 120 m.Nm (17 Ozf.in).

Screw the 4 diluent reservoir screws according to the tightening torque above.

If the tube under the reservoir body has been disconnected, connect it before installing back the diluent reservoir in its location.

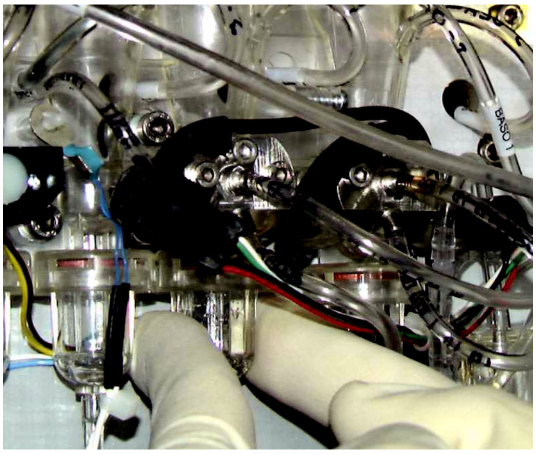
Install the diluent reservoir in its location and block the screws.

8. Draining chambers O’ring replacement (4xFAA066A)

Make sure the chambers are drained, if not run a **Services\Super User Menu\Hydraulic\Unprime Cycle\All** command to drain the chambers.

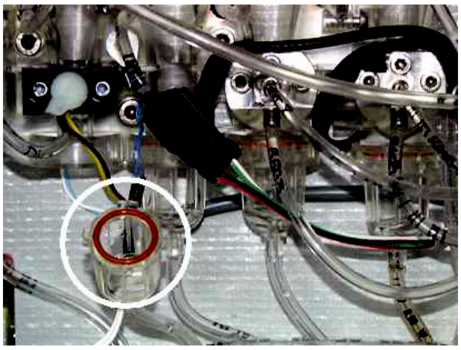
Put a piece of absorbant paper or cloth under the chambers assembly.

Turn gently the chamber’s bottom between 2 fingers (See Diag.13: “Draining chamber dismantling”, page 9).



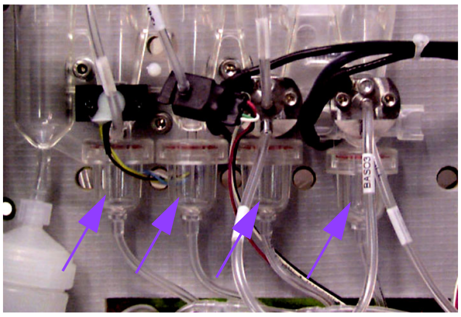
Diag.13:Draining chamber dismantling

Replace the O'ring (See Diag.14: "Draining chamber O'ring replacement", page 9).



Diag.14:Draining chamber O'ring replacement

Repeat for all the chambers the same operation (See Diag.15: "Draining chambers", page 9).



Diag.15:Draining chambers

9. Counting heads RBC\WBC coaxial cable O'ring replacement (2xFAA046A)

Make sure the chambers are drained, if not run a **Services\Super User Menu\Hydraulic\Unprime Cycle\All** command to drain the chambers.

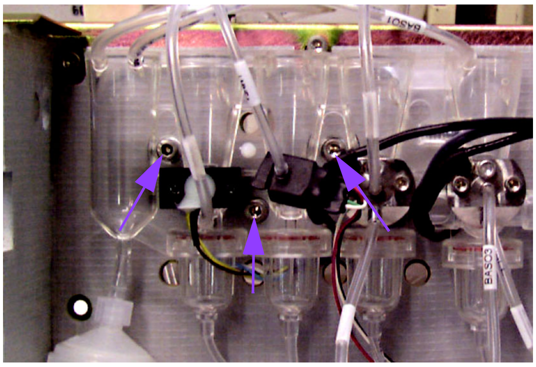
Switch the instrument off.

Put a piece of absorbant paper or cloth under the chambers assembly.

Record the tube positions before dismantling the chambrs assembly.

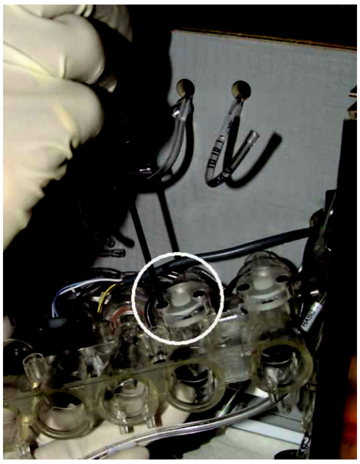
Disconnect chamber's tubes except for the wastes.

Unscrew the 3 screws from the chambers assembly (See Diag.16: "Draining chambers assembly dismantling", page 10).



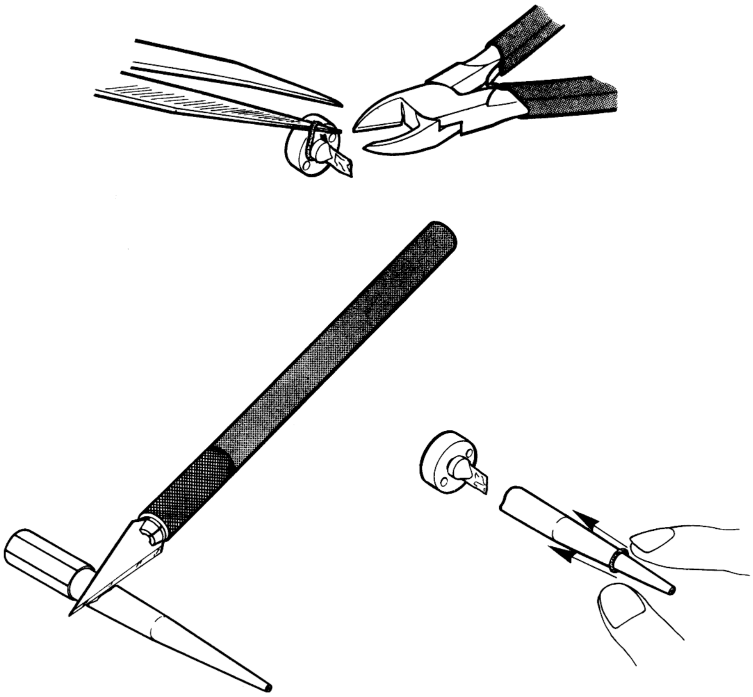
Diag.16:Draining chambers assembly dismantling

Dismantle the electrode loosening the 2 fixation screws (See Diag.17: “Electrode dismantling”, page 10).



Diag.17:Electrode dismantling

Use a previously cut micropipette tip to replace the electrode O’ring (See Diag.18: “Electrode O’ring replacement”, page 11).

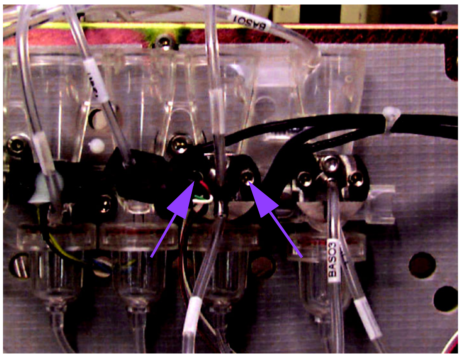


Diag.18:Electrode O'ring replacement

Reassemble the electrode.
Repeat for the other electrode the same operation.

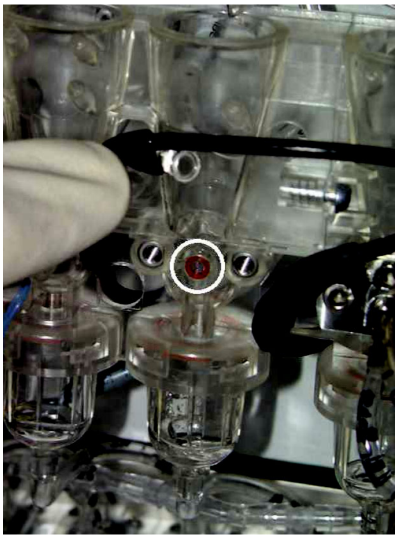
10. Counting head aperture joint replacement (2xGBG156A)

Carefully dismantle the counting head (See Diag.19: “Counting heads dismantling”, page 11) and plunge the aperture in distilled water.



Diag.19:Counting heads dismantling

Replace EPO joints by new ones (See Diag.20: “Counting heads aperture joint”, page 12).



Diag.20:Counting heads aperture joint

Clean the chamber and the counting head with liquid soap.

⚠ Do not introduce any sharp instrument inside so as to avoid damaging the inside of the chamber and the aperture.

Do not manipulate the aperture using hard instruments. Clean the aperture with a piece of soft paper or preferably in between 2 fingers.

Rinse thoroughly with distilled water.
Dry the exterior of the chambr with a soft paper.

⚠ It is recommended to reconnect the tubes on the counting head before reassembling the electrode and the chamber in order to avoid applying constraint on the chamber.

Do not apply too much pressure on the electrode fixation screws as it can break the aperture. Tightening torque = 120 m.Nm (17 Ozf.in).

Reassemble the electrode.
Repeat with the other counting head the same operation.

11. Check up after intervention

Before reassimbling the covers start the instrument and check there is no leak.
Reassemble the covers.
Perform the RAS340 Check up after intervention procedure

MDSS Technology pentra 80

Piston & Needle kit replacement Procedure

RAS327AA

HORIBA ABX DIAGNOSTICS

Concerns

Pentra 80 maintenance procedure

- Sampling probe: Probe & Guide replacement
- Reagents syringe: Pistons replacement
- Vacuum\waste pump: Piston replacement

Required tools

- Hexagonal Keys
- Dynamometric screw drivers A302, A301, A300
- Cutting pliers
- Flat screw driver
- Philips screw drivers
- Torx keys

Required products

Minoclair

Intervention time

2h.

Frequency

See maintenance table

Specific kit or consumables

Piston & Needle kit: XEA711AS

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Piston & Needle kit

Table 1: Piston & Needle kit XEA711AS

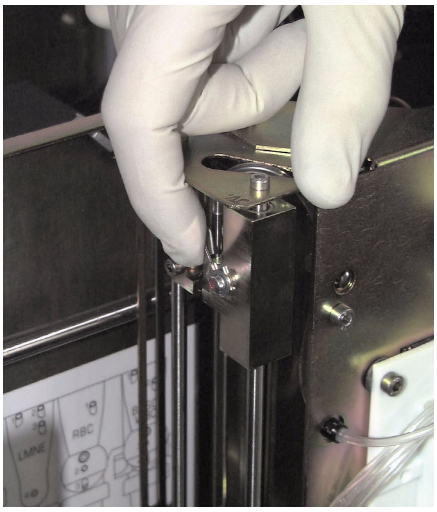
P/N	Designation	Qty
GBC030A	Piston	4
GBC031A	Piston	1
GBG052A	Piston D=31 (Counting and draining syringes)	3
GBG170A	Rinsing block O'ring thightener	1
XDA655AS	Sampling probe	1
GBG169A	Percutor	1

⚠ This procedure must be performed on a clean instrument.If the instrument is suspected not to be perfectly clean, perform a concentrated cleaning.

2. Maintenance

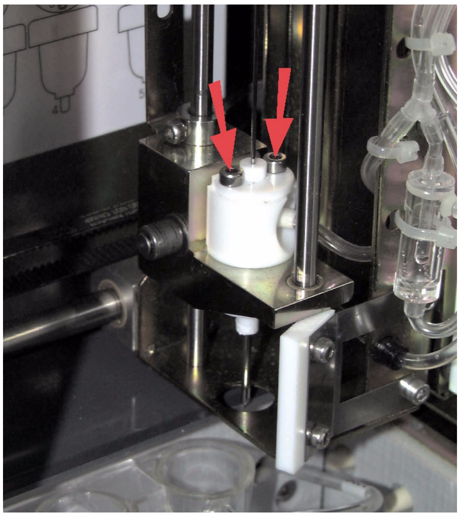
2.1. Sampling probe (XDA655AS), Percutor (GBG169A) & O'ring tightener (GBG170A) replacement

Switch the instrument off and disconnect power supply cable.
Open the righthand side door.
Move the carriage to access to the rinsing block.
Remove the 2 rinsing block screws (See Diag.1:"Rinsing block dismantling", page 2).



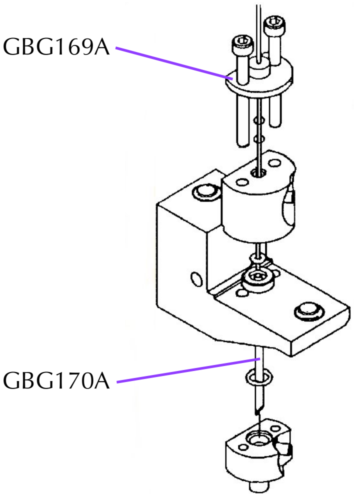
Diag.1:Rinsing block dismantling

Lift the locker (See Diag.2:"Lift locker", page 3) to free the probe and remove the rinsing block.



Diag.2:Lift locker

Replace the probe, the percutor and the rinsing block O’ring tightening part (See Diag.3:“Rinsing block unit”, page 3).



Diag.3:Rinsing block unit

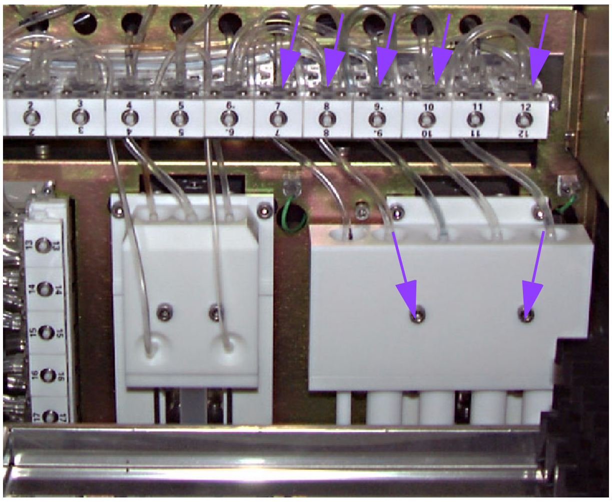
Use new O’rings when performing 6 month maintenance at the same time.
Do not tight too much the rinsing block screws (Torque: 120 mN.m \ 17 Ozf.in).

Reassemble in reverse order.

2.2. Reagent syringe pistons replacement (GBC031A & 4xGBC030A)

Switch the instrument off and disconnect power supply cable.
Remove the cover and the lefthand side panel to access to the reagent syringe (See RAS342 Front panel & Covers dismantling procedure for further details).

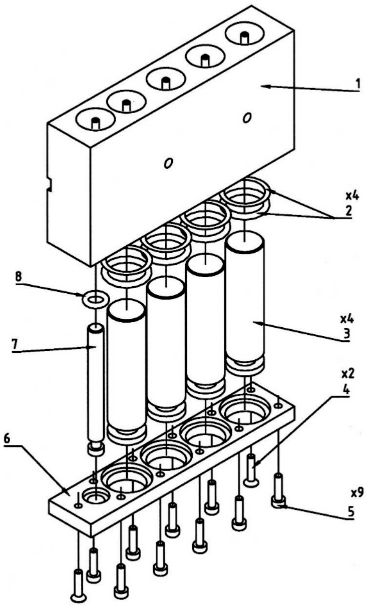
Disconnect the following tubes (See Diag.4:“Reagent syringe dismantling”, page 4):
- Valve 7 Inlet 3
- Valve 8 Inlet 3
- Valve 9 Inlet 3
- Valve 10 Inlet 3
- Valve 12 Inlet 3



Diag.4:Reagent syringe dismantling

Unscrew the 2 fixation screws and remove carefully the reagent syringe (See Diag.4:“Reagent syringe dismantling”, page 4).
Push several times the piston over the waste container to drain the syringes.
On a piece of absorbant paper open the reagent syringe: 9x CHC M3x12 screws, 2x FX M3x12 screws.
Replace the pistons (See Diag.5:“Reagent syringe piston replacement”, page 4).

Use new O’rings when performing 6 month maintenance at the same time.
The thickness of the washer is matched to each O’ring thickness. For this reason, keep the O’ring and the washer together. Lyse piston O’ring (small one) had no washer.



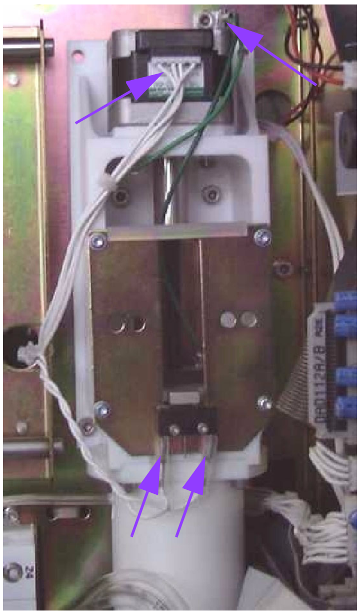
Diag.5:Reagent syringe piston replacement

Tightening torques
9x CHC M3x12:
400 mN.m (56.8 Ozf.in)
2x FX M3x12:
400 mN.m (56.8 Ozf.in)

Reassemble in reverse order (Use a dynamometric screwdriver to tighten the syringe).

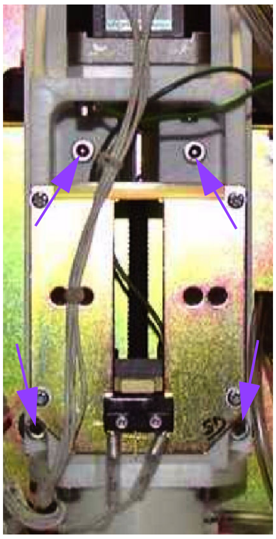
2.3. Draining syringe 1 piston replacement (GBG052A)

Switch the instrument off and disconnect power supply cable.
Remove the cover and the righthand side door to access to Draining syringe 1 (See RAS342 Front panel & covers dismantling procedure for further details).
Disconnect electrical connectors from the syringe (See Diag.6:"Draining 1 syringe electrical connections.", page 5).



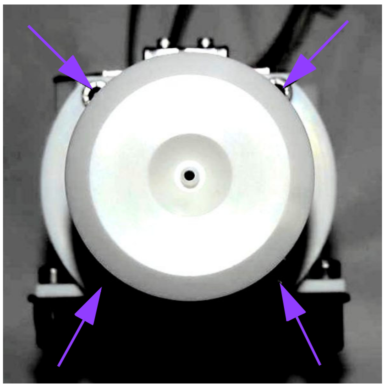
Diag.6:Draining 1 syringe electrical connections.

Unscrew the 4 syringe screws, just few turns to free silent block (See Diag.7:"Draining syringe 1 dismantling", page 5).



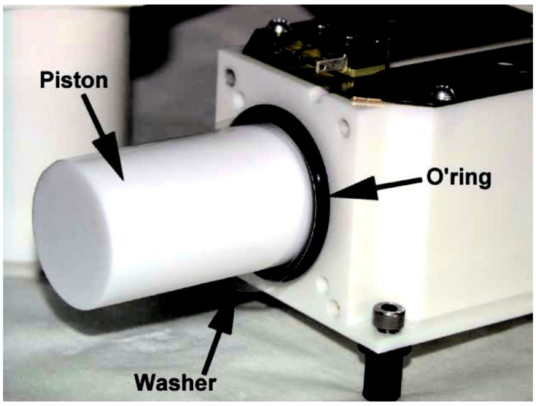
Diag.7:Draining syringe 1 dismantling

Put a piece of absorbant paper under the syringe and disconnect all the tubes from the syringe.
Remove the syringe.
Drain the syringe pushing the piston nut up and down several times.
Open the syringe (4xCHC M4x16 screws, See Diag.8:"Draining 1 syringe screws", page 6).



Diag.8:Draining 1 syringe screws

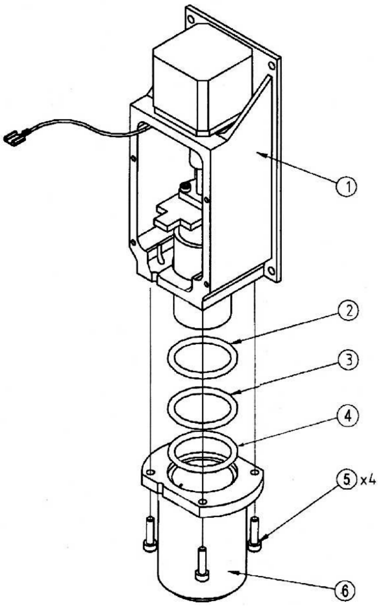
Replace the piston (See Diag.9:“Draining syringe 1 opened”, page 6).



Diag.9:Draining syringe 1 opened

⚠ Use new O’ring when performing 6 month maintenance at the same time.

Reassemble in reverse order (See Diag.10:“Draining syringe 1 view”, page 6).



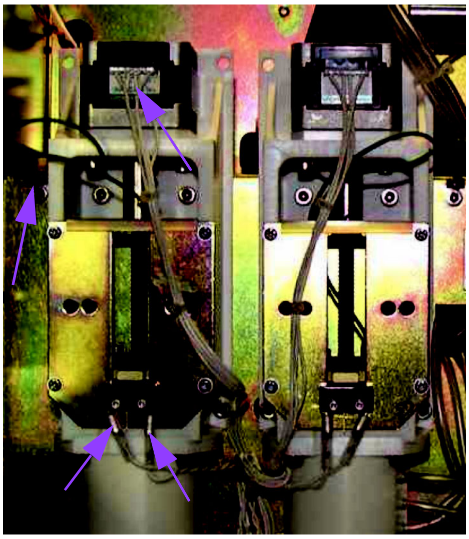
Diag.10:Draining syringe 1 view

2.4. Draining syringe 2 piston replacement (GBG052A)

Switch the instrument off and disconnect power supply cable.

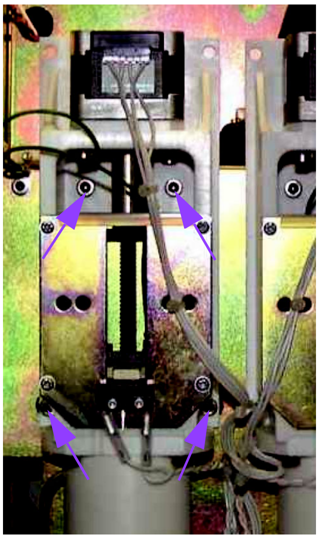
Remove the cover and the lefthand side panel to access to the reagent syringe (See RAS342 Front panel & Covers dismantling procedure for further details).

Disconnect electrical connectors from the syringe (See Diag.11:“Draining syringe 2 electrical connections”, page 7).



Diag.11:Draining syringe 2 electrical connections

Unscrew the 4 syringe screws, just few turns to free silent block (See Diag.12:“Draining syringe 2 dismantling”, page 7).



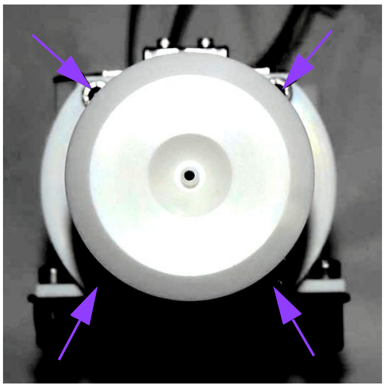
Diag.12:Draining syringe 2 dismantling

Put a piece of absorbant paper under the syringe and disconnect all the tubes from the syringe.

Remove the syringe.

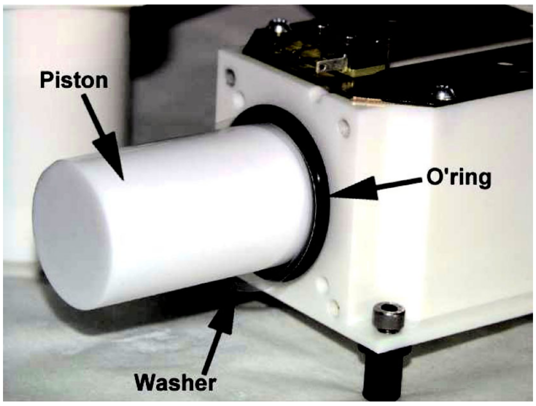
Drain the syringe pushing the piston nut up and down several times.

Open the syringe (4x CHC M4x16 screws, See Diag.13:“Draining syringe 2 screws”, page 8).



Diag.13: Draining syringe 2 screws

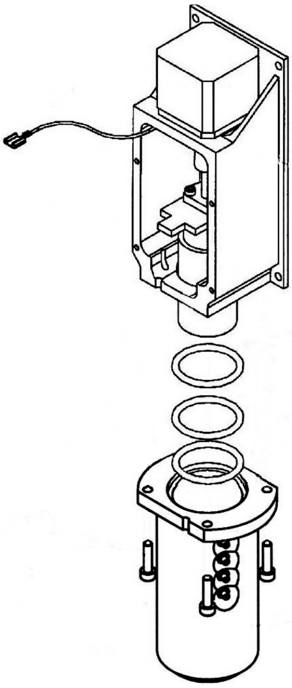
Replace the piston (See Diag.14:“Draining syringe 2 opened”, page 8).



Diag.14:Draining syringe 2 opened

⚠ Use new O’ring when performing 6 month maintenance at the same time.

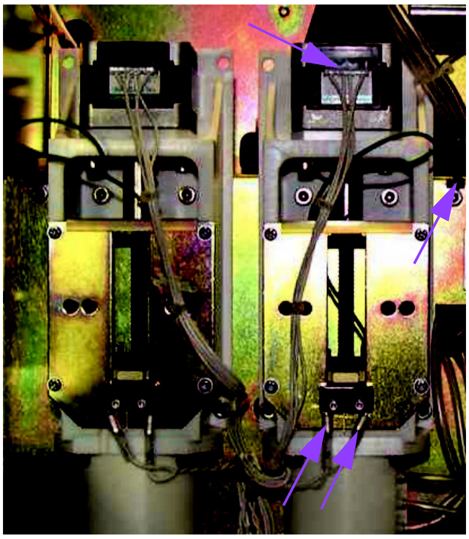
Reassemble in reverse order (See Diag.15:“Draining syringe 2 view”, page 8).



Diag.15:Draining syringe 2 view

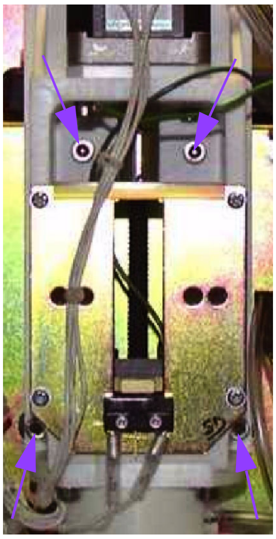
2.5. Counting syringe piston replacement (GBG052A)

Switch the instrument off and disconnect power supply cable.
Remove the cover and the lefthand side panel to access to the reagent syringe (See RAS342 Front panel & Covers dismantling procedure for further details).
Disconnect electrical connectors from the syringe (See Diag.16:“Counting syringe electrical connections”, page 9).



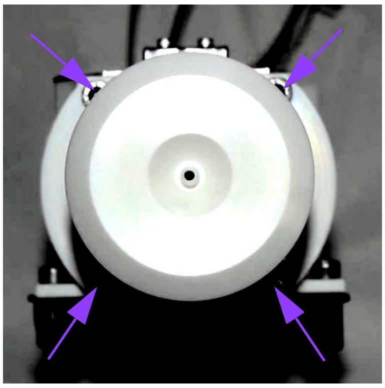
Diag.16:Counting syringe electrical connections

Unscrew the 4 syringe screws, just few turns to free silent block (See Diag.17:“Counting syringe dismantling”, page 9).



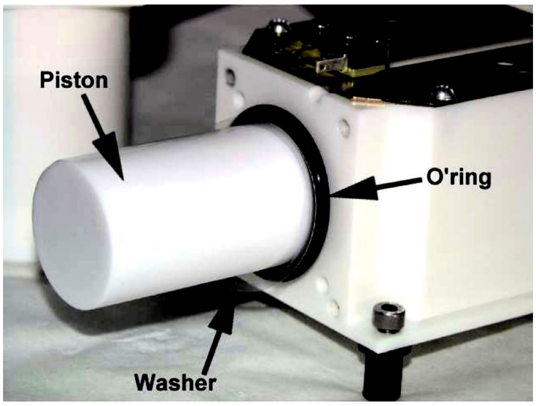
Diag.17:Counting syringe dismantling

Put a piece of absorbant paper under the syringe and disconnect all the tubes from the syringe.
Remove the syringe.
Drain the syringe pushing the piston nut up and down several times.
Open the syringe (4x CHC M4x16 screws, See Diag.18:“Counting syringe screws”, page 10).



Diag.18:Counting syringe screws

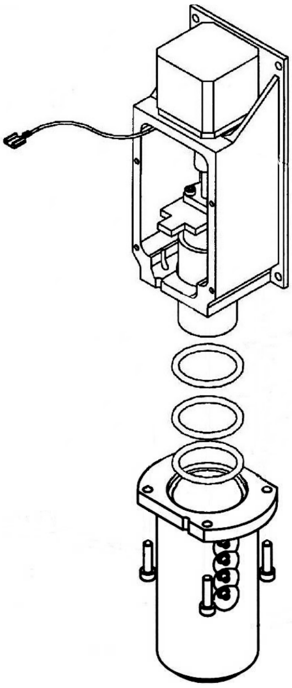
Replace the piston (See Diag.19:“Counting syringe opened”, page 10).



Diag.19:Counting syringe opened

⚠ Use new O’ring when performing 6 month maintenance at the same time.

Reassemble in reverse order (See Diag.20:“Counting syringe view”, page 10).



Diag.20:Counting syringe view

3. Instrument cleaning

Concerned assemblies:

- All the thermostated compartment.
- Outer surfaces of the instrument (perpex, covers, reagent locations....).
- Waste connector plug.
- Liquid valve push button.
- Assemblies close to the needle.
- Tube holder assembly.
- Overflow trays.

Cleaning:
Dilute the 12°cl bleach to 1 part of bleach for 4 of deionize water (1/5).
Instrument environment must be cleaned.

No sponge, nor cloth must be used. Only absorbant paper, thrown after use in contamination bins, have to be used. For small or sensitive assemblies, use accurate drier papers.

All assemblies suspected to have been in contact with biohazardous material must be disinfected with diluted bleach (the stainless steel must be bleached below 30°Celsius).

Blood stains or salt marks must be cleaned with spray detergent first.

Reinstall all the assemblies and setup the instrument back to its initial configuration.

Decontamination and rinse Procedure

RAS328AA

Concerns

Instrument decontamination before maintenance operations in the following cases:

- Instrument removed from biohazardous area
- Maintenance intervention on contaminated assemblies

Required tools

- Hexagonal keys
- Clamps
- Flat scrw driver
- Torx keys

Required products

- Fungicidal, bacterial, virus killing detergent spray, non corrosive for metals, non plastic altering.
- Bleach solution 12°Cl
- Deionized water
- Distilled water
- Absorbant paper

Intervention time

1h30min.

Frequency

On request

Specific kit or consumables

None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Preparation

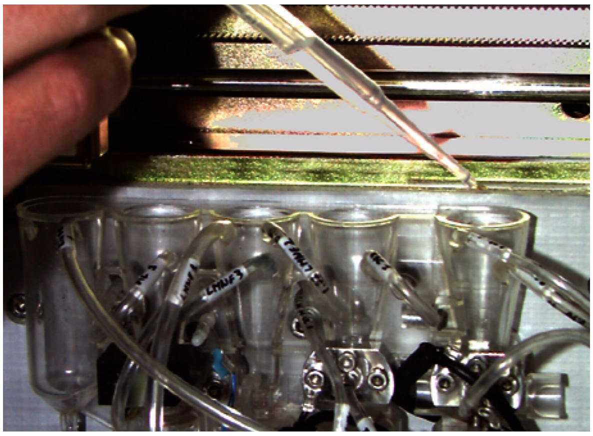
Switch the instrument on.

Open the thermal door (Righthand side of the instrument).

Perform an **Concentrated Cleaning** from menu: **Service\Menu SuperUser\Hydraulical\Clean Cycles**.

Confirm the concentrated cleaning by pressing **Ok** button.

When asked during the concentrated cleaning cycle, poor 3ml of Minoclair in each chamber, then click ok to continue.



Diag.1:Poor Minoclair

When cycle is finished, switch the instrument off and remove the power supply cable.

Remove the instrument’s covers (See procedure RAS342).

Spray the bactericidal cleaner on all biohazardous areas (assemblies in contact with the biohazardous material such as instrument cover, tube holder, keyboard...) and waits for 10 minutes.

2. Manual decontamination

Dilute the 12°Cl bleach to 1 part of deionize water (1/5).

Instrument environment must be cleaned and decontaminated.

No sponge, nor cloth must be used, only absorbant paper thrown after use in contamination bins, have to be used. For small or sensitive assemblies use accurate drier papers.

All assemblies suspected to have been in contact with biohazardous material must be disinfected with diluted bleach (the stainless steel must be bleached below 30°C).

Blood stains or salt marks must be cleaned with spray detergent first.

Concerned assemblies:

- Outer surfaces of the instrument (perpex, covers, reagent locations...)
- Waste connector plug
- Liquid valve push button
- Assemblies close to the needle
- Overflow tray

Put back all the assemblies and setup the instrument back to its initial configuration.

3. Analysis circuit decontamination

Prepair 1 bottle containing 1/2 litre of bleach diluted to 1 part of bleach for 9 parts of deionize water (1/10).

Prepair 1 bottle containing 1/2 litre of distilled water.

Replace the reagent bottles (Alphalyse, Basolyse II and Eosinofix) by the diluted bleach bottles

Switch the instrument on.

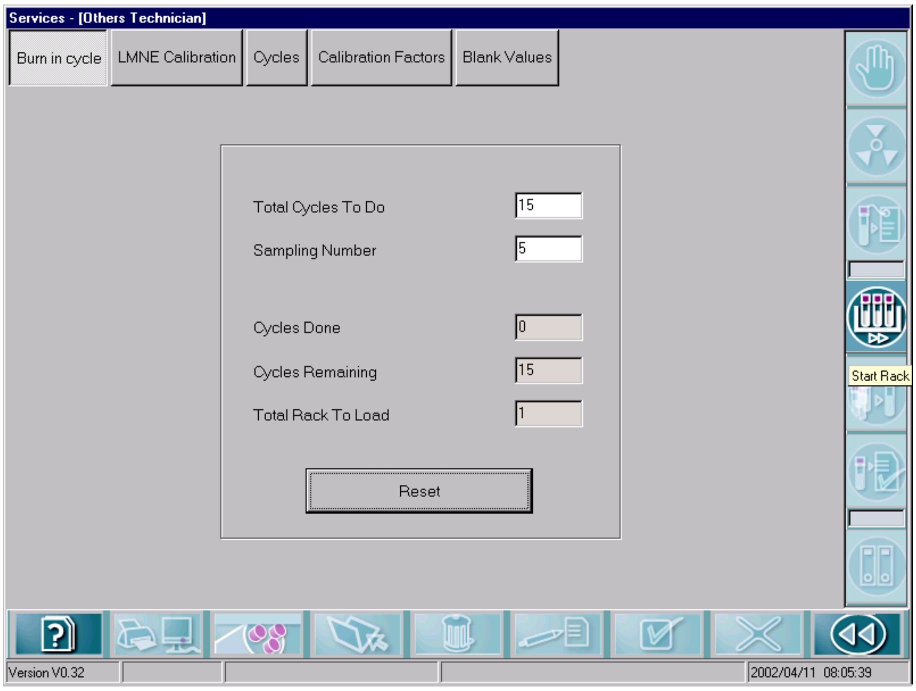
Run an **All reagents** prime cycle from menu: **Service\Menu SuperUser\Hydraulical\Prime**

cycles.

Fill a sample tube with diluted bleach to 1 part of bleach for 4 parts of deionize water (1/5).

Run 15 **Burn-in** cycles from menu: **Service\Menu Technician \Others\Burn-in cycle**.

Enter 15 cycles in Total **Cycles To Do** then press button **Start rack** (See “Burn-in cycle screen”, page 3).


Services - [Others Technician]
Burn in cycle
LMNE Calibration
Cycles
Calibration Factors
Blank Values
Reset
Start Rack
Version V0.32
2002/04/11 08:05:39

Total Cycles To Do: 15
Sampling Number: 5
Cycles Done: 0
Cycles Remaining: 15
Total Rack To Load: 1

Diag.2:Burn-in cycle screen

Leave the instrument operating until it stops.

4. Drain and Rinse

Remove the 3 reagent straws from the bottle and wrap the straws into absorbant paper.

Run 2 **All reagents** prime cycles from menu: **Service\Menu SuperUser\Hydraulical\Prime cycles**, the bleach is drained.

Replace the diluted bleach bottle by the distilled water bottle and plunge the straws into distilled water.

Run 6 **All reagents** prime cycles from menu: **Service\Menu SuperUser\Hydraulical\Prime cycles**, the bleach is drained.

Remove the 3 reagent straws from the distilled water bottle and wrap the straws into absorbant paper.

Run 2 **All reagents** prime cycles from menu: **Service\Menu SuperUser\Hydraulical\Prime cycles**, the bleach is drained.

Run a **Shutdown** cycle.

Re-install the reagent bottles and the straws.

⚠ When rinse is finished check that LMNE chamber is empty.

Put back instrument’s covers.

Chambers Adjustment Procedure

RAS329AA

- Concerns

  Chambers check and alignment

- Required tools

  Allen keys

- Required products

  None

- Intervention time

  15 min.

- Frequency

  On request

- Specific kit or consumables

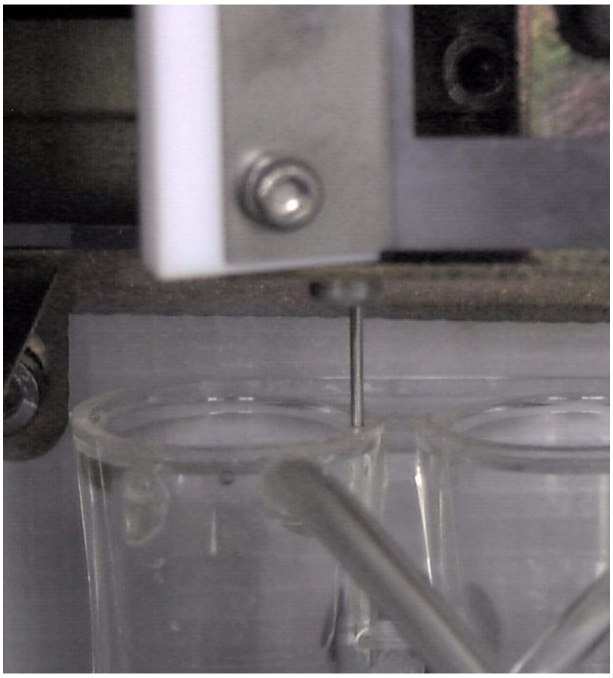
  None

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

It is mandatory to perform the Probe adjustment procedure after this adjustment.

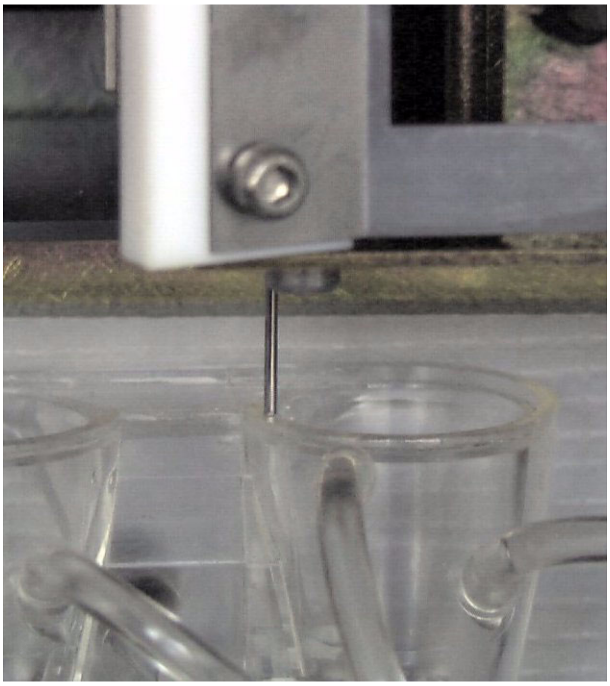
1. Alignment check and adjustment

This adjustment procedure must be carried out when chamber assembly is moved or replaced.
Switch off the instrument and disconnect power supply cable.
Remove cover (See RAS342)
Move the carriage over the rinse chamber, then gently push down on the probe until it touch the top of the rinse bath(See Diag.1 “Rinse chamber position”, page 2).



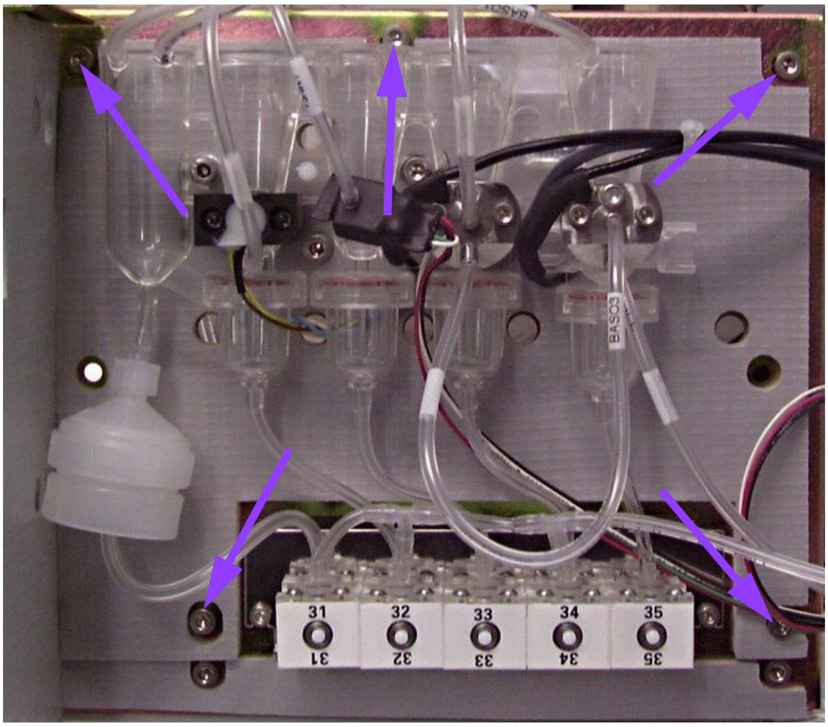
Diag.1 Rinse chamber position

Without lifting the probe, gently push the carriage over the WBC/BASO chamber (See Diag.2 “WBC chamber position”, page 3).



Diag.2 WBC chamber position

Check that there is the same height between probe and Rinse and WBC/Baso tops of chambers.
If you need to get a better position, free the chamber support by loosening the 5 screws.(See Diag.3 "Chamber support screws", page 3).



Diag.3Chamber support screws

Locate probe (See Diag.1 "Rinse chamber position", page 2).
Tighten gently the left upper screw.
Without lifting the probe, gently push the carriage over the WBC/BASO chamber. (See Diag.2 "WBC chamber position", page 3)
Check that there is the same height between probe and Rinse and WBC/Baso tops of chambers.
If necessary adjust position by moving up and down chamber support.
Perform an alignment check as describe at the beginning of this procedure.
When adjustment is correct, tighten screws and perform a **Probe adjustment** procedure.

Probe Adjustment Procedure

RAS330AA

- Concerns

  Check and adjustment of the probe

- Required tools

  None

- Required products

  None

- Intervention time

  15min

- Frequency

  On request

- Specific kit or consumables

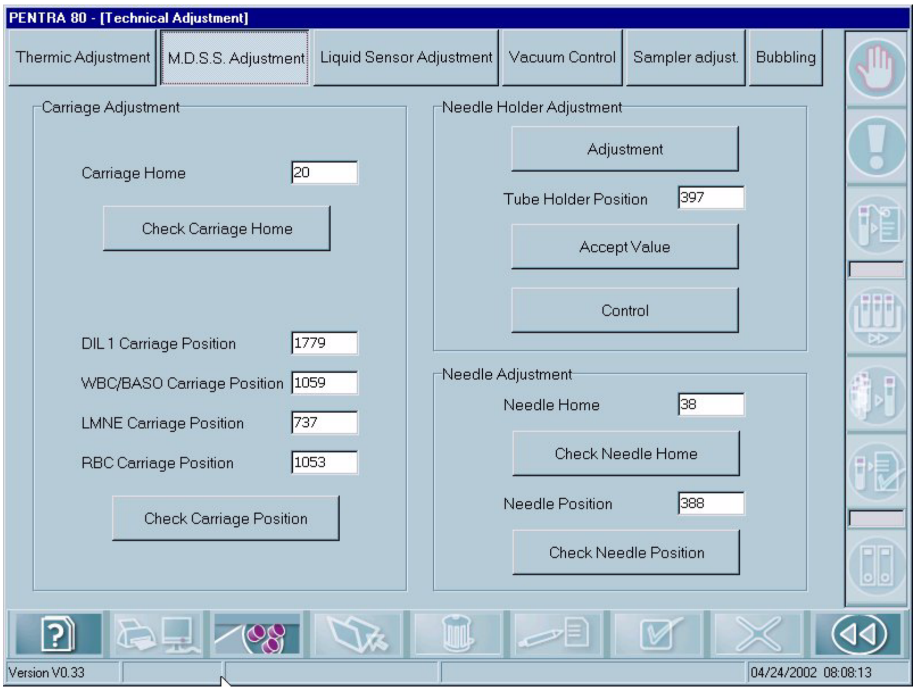
  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. MDSS adjustment menu

Check that chamber assy is parallel to the carriage motion before checking or making an adjustment of the Probe position.
Follow CHAMBERS ADJUSTMENT procedure of this manual (RAS329AA).

Probe adjustments can be accessed by: «**Menu\Service\Menu Technician\Gains\MDSS adjustment**»(See Diag.1 “MDSS adjustment menu”, page 2).


PENTRA 80 - [Technical Adjustment]
Thermic Adjustment
M.D.S.S. Adjustment
Liquid Sensor Adjustment
Vacuum Control
Sampler adjust.
Bubbling
Carriage Adjustment
Check Carriage Home
Check Carriage Position
Needle Holder Adjustment
Adjustment
Accept Value
Control
Needle Adjustment
Check Needle Home
Check Needle Position
Version V0.33
04/24/2002 08:08:13

Carriage Home: 20
DIL 1 Carriage Position: 1779
WBC/BASO Carriage Position: 1059
LMNE Carriage Position: 737
RBC Carriage Position: 1053
Tube Holder Position: 397
Needle Home: 38
Needle Position: 388

Diag.1 MDSS adjustment menu

Check probe position before any adjustment.

2. Needle adjustment

2.1. Needle Home Check

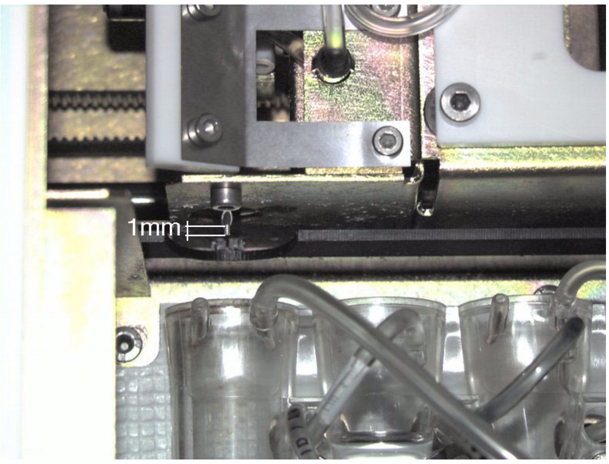
Remove cover (See RAS342).
Enter «**Menu\Service\Menu Technician\Gains\MDSS adjustment**» (See Diag.1 “MDSS adjustment menu”, page 2).

Press «**Check Needle Home**» button (See Diag.2 “Check needle home”, page 2).

Check Needle Home

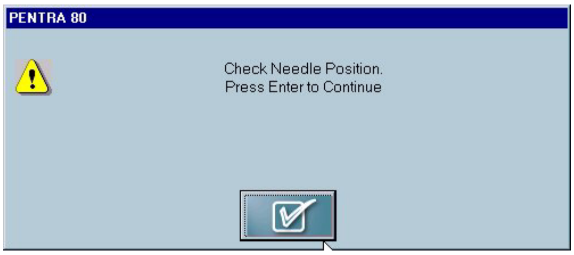
Diag.2 Check needle home

Check that the probe is about 1mm out from the percing needle (See Diag.3 “Needle home position”, page 3).



Diag.3 Needle home position

Press «**OK**» to continue (See Diag.4 “Check needle position button”, page 3).



Check Needle Position.
Press Enter to Continue

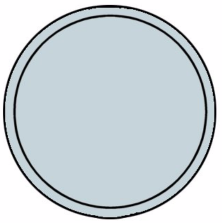
Diag.4 Check needle position button

2.2. Needle Home Adjustment

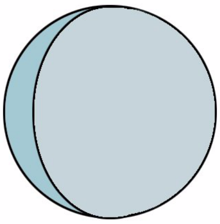
Check needle home position (See 2.1. “Needle Home Check”, page 2).
If probe is too low (gap>1mm), increase **Needle home** number of step.
If probe is too hight (gap<1mm), decrease **Needle home** number of step.
Run the «**check needle home**» again to control the gap (See above).

2.3. Needle position check

To check the right position of the probe, you must see inlet as in diagram **A** and not as in diagram **B** (where circles are not concentric).

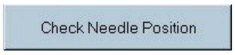


A Right position



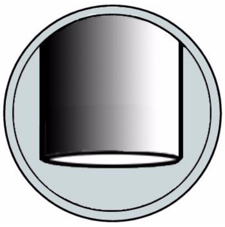
B Wrong position

Remove cover (See RAS342).
Enter «**Menu\Service\Menu Technician\Gains\MDSS adjustment**» (See Diag.1 "MDSS adjustment menu", page 2).
Press «**Check Needle Position**» button (See Diag.5 "Check needle position", page 4).



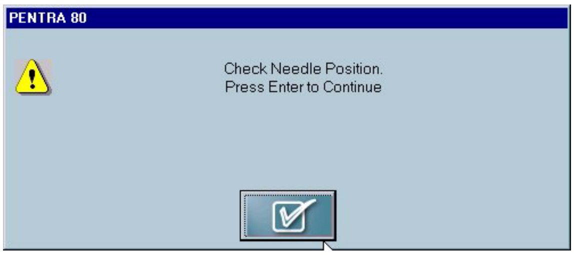
Diag.5 Check needle position

The sampling needle moves over the **LMNE chamber**.
Disconnect the tube connected to the inlet and check in front of the inlet the right location of the probe: if the probe is well adjusted, you will see it as in the following diagramm (See Diag.6 "Needle perfect position", page 4).



Diag.6 Needle perfect position

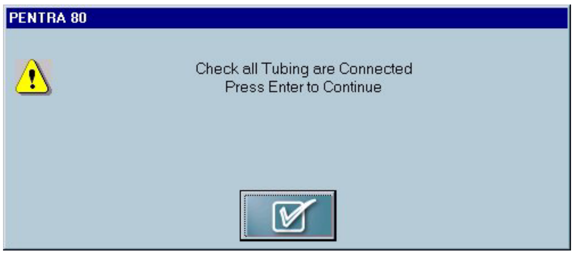
Press «**OK**» to continue (See Diag.7 "Check needle position button", page 4).



Check Needle Position.
Press Enter to Continue

Diag.7 Check needle position button

At the end of the cycle, connect tubing to the inlet when the following screen appears (See Diag.8 "Check tubing", page 4).



Check all Tubing are Connected
Press Enter to Continue

Diag.8 Check tubing

Press «**OK**» to continue.

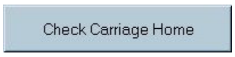
2.4. Needle position adjustment

Check needle position (See 2.3. "Needle position check", page 3).
If probe is too low, increase **Needle position** number of step.
If probe is too hight, decrease **Needle position** number of step.
Run the «**Check Needle Position**» again to control the good position (See above).

3. Carriage adjustment

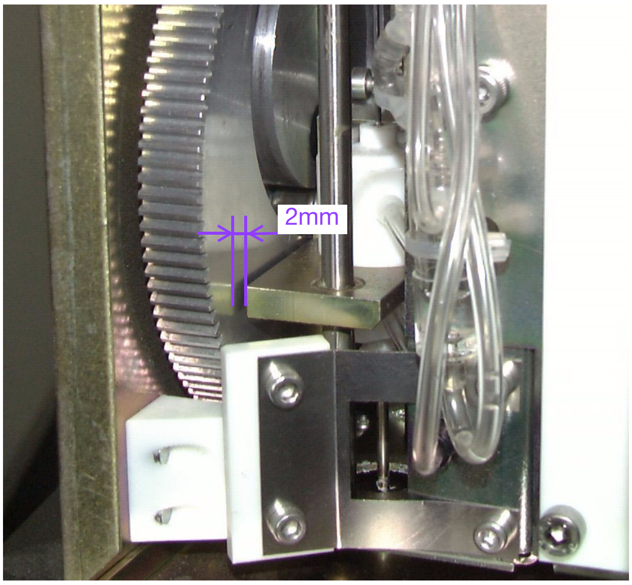
3.1. Carriage home check

Remove cover (See RAS342).
Enter «**Menu\Service\Menu Technician\Gains\MDSS adjustment**» (See Diag.1 “MDSS adjustment menu”, page 2).
Press «**Check Carriage Home**» button (See Diag.9 “Check carriage home button”, page 5).



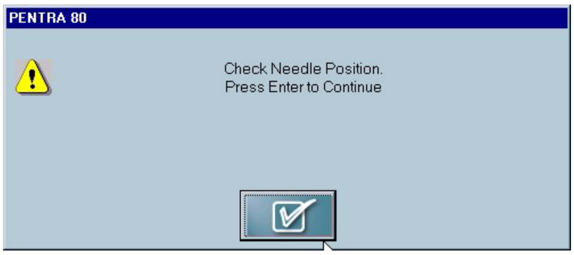
Diag.9 Check carriage home button

The «CARRIAGE HOME» position is a factory made adjustment and must not be changed. It represent a gap of 2mm between the tooth wheel and the front of the carriage (See Diag.10 “Carriage home position”, page 5).
This carriage position is also the Sampling position, if you need to readjust the sampling position, move the tube holder, but do not change the «CARRIAGE HOME» value.



Diag.10 Carriage home position

Check the gap between the tooth wheel and the front of the carriage then press «**OK**» at the following screen (See Diag.11 “Check needle position button”, page 5).

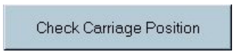


Check Needle Position.
Press Enter to Continue

Diag.11 Check needle position button

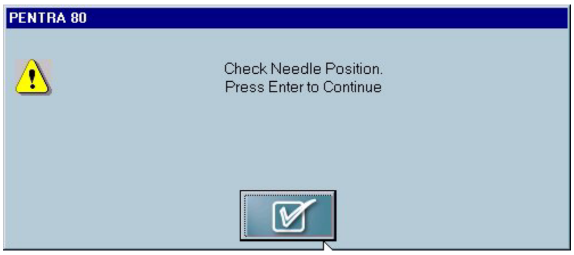
3.2. Carriage position check

Enter «**Menu\Service\Menu Technician\Gains\MDSS adjustment**»
Press «**Check Carriage Position**» button (See Diag.12 “Check carriage position button”, page 6).



Diag.12 Check carriage position button

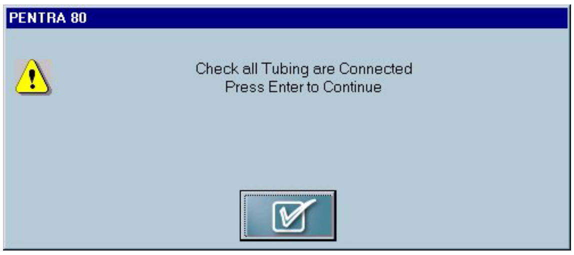
The sampling needle moves over a chamber.
Check the probe position as describe above (See Diag.6 “Needle perfect position”, page 4).
Press «**OK**» at the following screen (See Diag.13 “Check needle position button”, page 6) to move to the next chamber and continue until the end of the cycle.



Check Needle Position.
Press Enter to Continue

Diag.13 Check needle position button

At the end of the cycle, connect tubing to the inlet when the following screen appears (See Diag.14 “Check tubing”, page 6).



Check all Tubing are Connected
Press Enter to Continue

Diag.14 Check tubing

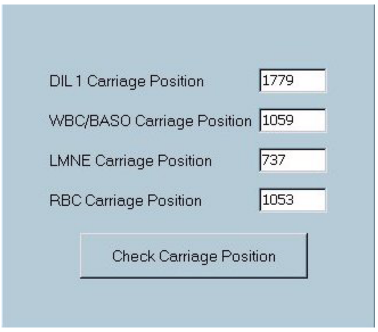
Press «**OK**» to continue.

3.3. Carriage Positions adjustment

⚠ Needle Up and Down position is the same for all the chambers and cannot be modified from one to another (adjustment by Needle Position value).

Before any adjustment, check the probe position in each chamber with the «**Menu\Service\Menu Technician\Gains\MDSS adjustment\Check Carriage Position**» option.

Adjust probe position for all the chambers separately in the software cycle order (See Diag.15 “Carriage positions values”, page 7).



DIL 1 Carriage Position 1779

WBC/BASO Carriage Position 1059

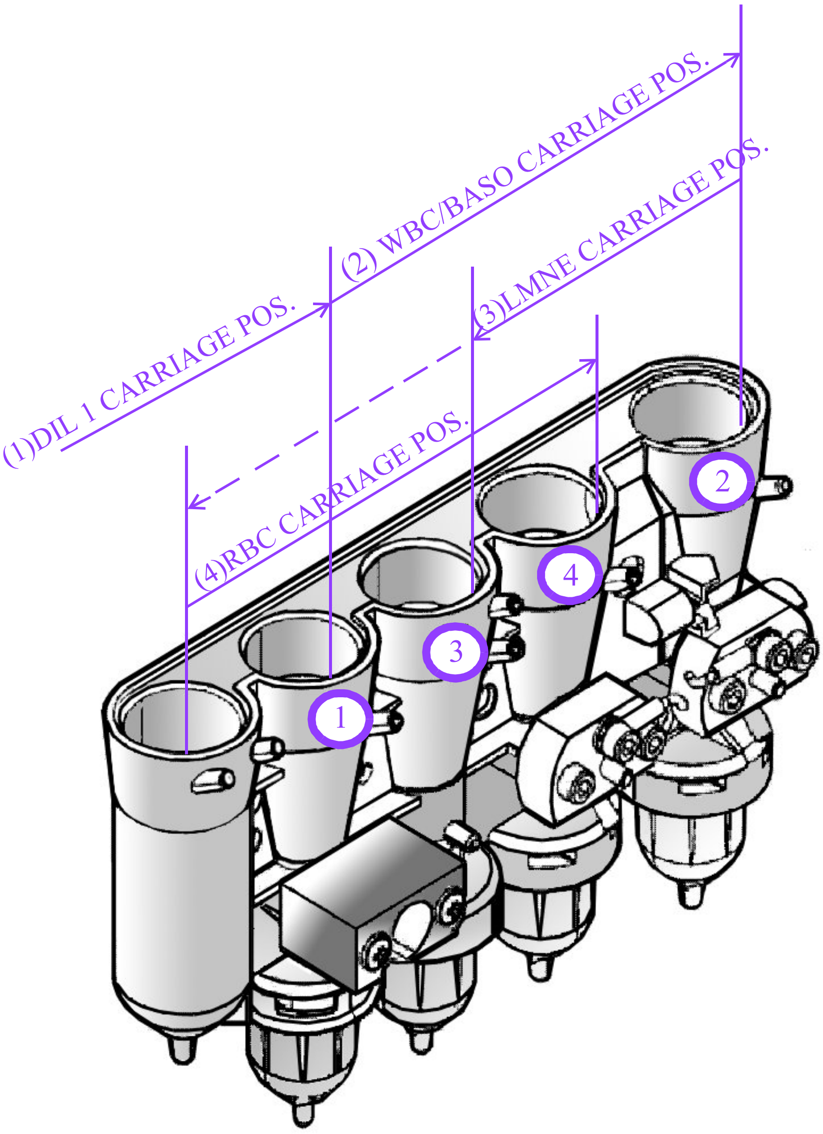
LMNE Carriage Position 737

RBC Carriage Position 1053

Check Carriage Position

Diag.15 Carriage positions values

If you want to modify only one of the position, remind to increase or decrease the next motion with the same number of steps, not to loose the other adjustments ().


(1)DIL 1 CARRIAGE POS.
(2) WBC/BASO CARRIAGE POS.
(3)LMNE CARRIAGE POS.
(4)RBC CARRIAGE POS.
1
2
3
4

Diag.16 Chambers

Main Board Adjustment Procedure

RAS331AA

- Concerns

  Main board adjustment:
  - How to access to Main board
  - Main board general view
  - Main board supply check
  - Main board adjustment

- Required tools
  - Allen keys
  - Voltmeter

- Required products

  None

- Intervention time

  30 min.

- Frequency

  On request

- Specific kit or consumables

  None

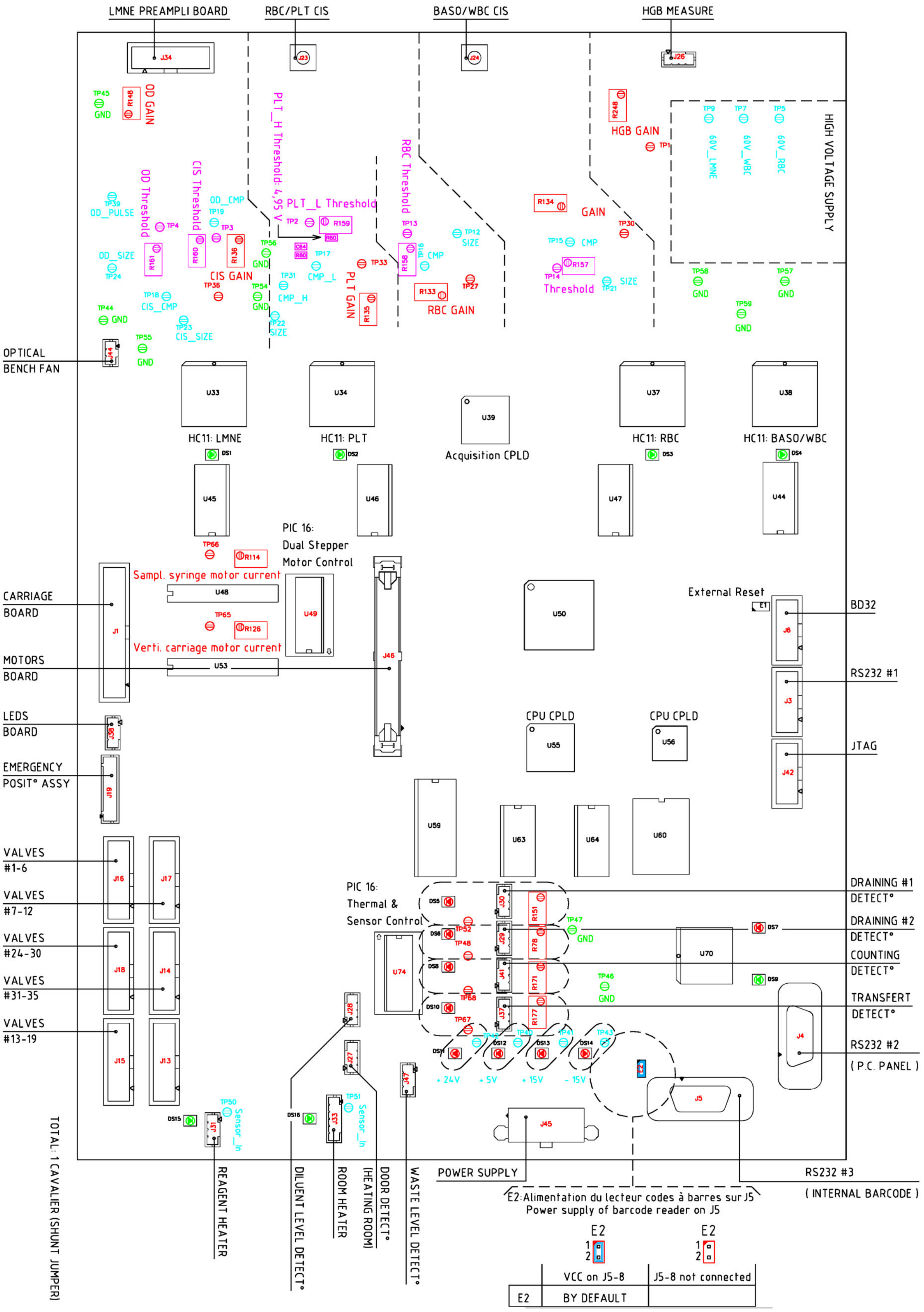
Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. How to access Main board

Remove the righthand side cover of the instrument:

- Open the righthand side front cover.
- Remove the thermal panel.
- Unscrew the 9 screws from the righthand side cover and carefully remove the cover.
- Unscrew the 2 screws on the top of the frame from the inside protection and remove it.

2. Main board general view


LMNE PREAMPLI BOARD
RBC/PLT CIS
BASO/WBC CIS
HGB MEASURE
J34
J23
J24
J26
TP45
GND
R148
OD GAIN
PLT_H Threshold: 4,95 V
RBC Threshold
R248
HGB GAIN
TP1
TP9
TP7
TP5
60V_LMNE
60V_WBC
60V_RBC
HIGH VOLTAGE SUPPLY
TP39
OD_PULSE
OD Threshold
CIS Threshold
OD_CMP
TP19
TP4
TP3
PLT_L Threshold
TP2
R159
R134
GAIN
TP30
OD_SIZE
TP24
R161
R160
R136
TP56
GND
TP17
TP13
TP12
SIZE
TP15
CMP
R157
TP14
Threshold
TP21
SIZE
CIS GAIN
TP36
TP31
CMP_L
TP33
PLT GAIN
R158
CMP
R133
TP27
RBC GAIN
TP58
GND
TP57
GND
TP59
GND
TP18
CIS_CMP
TP54
GND
CMP_H
R135
TP44
GND
TP23
CIS_SIZE
TP22
SIZE
TP55
GND
OPTICAL BENCH FAN
J44
U33
U34
U39
U37
U38
HC11: LMNE
HC11: PLT
Acquisition CPLD
HC11: RBC
HC11: BASO/WBC
DS1
DS2
DS3
DS4
U45
U46
U47
U44
PIC 16:
Dual Stepper
Motor Control
TP66
R114
Sampl. syringe motor current
U48
U49
TP65
R126
Verti. carriage motor current
U53
CARRIAGE BOARD
J1
MOTORS BOARD
J46
U50
External Reset
E1
BD32
J6
RS232 #1
J3
JTAG
J42
LEDS BOARD
J36
EMERGENCY POSIT° ASSY
J19
CPU CPLD
U55
CPU CPLD
U56
U59
U63
U64
U60
VALVES #1-6
J16
J17
VALVES #7-12
VALVES #24-30
J18
J14
VALVES #31-35
VALVES #13-19
J15
J13
PIC 16:
Thermal &
Sensor Control
DS5
J30
R151
DS6
TP52
TP48
J29
R78
TP47
GND
DS8
J41
R171
TP46
GND
U74
TP68
DS10
J37
R177
TP67
U70
DS7
DS9
DRAINING #1 DETECT°
DRAINING #2 DETECT°
COUNTING DETECT°
TRANSFERT DETECT°
J28
J27
DS11
DS12
DS13
DS14
TP43
+ 24V
+ 5V
+ 15V
- 15V
E2
J4
RS232 #2
(P.C. PANEL)
J47
J5
DS15
TP50
J31
Sensor_In
DS16
J33
TP51
Sensor_In
J45
TOTAL: 1 CAVALIER (SHUNT JUMPER)
REAGENT HEATER
DILUENT LEVEL DETECT°
ROOM HEATER
(HEATING ROOM)
DOOR DETECT°
WASTE LEVEL DETECT°
POWER SUPPLY
RS232 #3
(INTERNAL BARCODE)
E2:Alimentation du lecteur codes à barres sur J5
Power supply of barcode reader on J5
E2
1
2
E2
1
2
VCC on J5-8
J5-8 not connected
E2
BY DEFAULT

Diag.1:Main board general view

3. Main board supply check

Table 1: Power supply voltages check (Ground on TP47)

Voltage	Test Point	Range
+24V	TP42	±1.4V
+5V	TP40	±0.15V
+15V	TP41	±0.5V
-15V	TP43	±0.5V

4. Main board adjustment

Remove the righthand side cover in order to access to the main board.

4.1. Hgb blank adjustment

Run command **Hgb Blank Adjustment** from menu: **Service\Technician\Measurement\Gain**.

The utility carries out a cycle a rinsing cycle of the WBC chamber and continuously displays the voltage used by the converter. The adjustement cycle lasts for 20 seconds.

Adjust to **4.7V ±0.02V** between Ground and **TP1** by the mean of **R248** potentiometer.

4.2. RBC\Plt gain adjustment

A special cycle allows the dilution of the RBC\Plt LATEX to 1/220th (10µl of LATEX with 2.2ml of diluent). A special count program carries out the calculation of the mean volume in the predefined zones and displays them every 700ms. The duration of the measurement cycle is 21 seconds.

The adjustment are made using **R133** potentiometer for **RBC** and **R135** for the **Plt**.

Run command **RBC\Plt Gain** menu: **Service\Technician\Measurement\Gain**.

Target values:
- **RBC = 78**
- **Plt = 112**

⚠ Mix RBC\Plt LATEX thoroughly before sampling.

4.3. WBC\Baso gain adjustment

A special cycle allows the dilution of the RBC\Plt LATEX to 1/733rd (3µl of LATEX with 2.2ml of diluent). A special count program carries out the calculation of the mean volume in the predefined zones and displays them every 700ms. The duration of the measurement cycle is 21 seconds.

The adjustment is made using **R134** potentiometer.

Run command **WBC\Baso Gain** menu: **Service\Technician\Measurement\Gain**.

Target values:
- **WBC\Baso = 102**

⚠ Mix RBC\Plt LATEX thoroughly before sampling.

4.4. Drain sensors adjustment

From menu **Service\Technician\Measurement\Gain\Liquid sensor adjustment** adjust all the different voltage values according to the following table.

Table 2: Drain sensors adjustment

Drain Sensor	Test Point	Potentiometer	Range \ Connector
Run draining 1	TP52	R151	4.5V ±0.3V \ J30
Run draining 2	TP48	R78	4.5V ±0.3V \ J29
Run draining 3	TP68	R171	4.5V ±0.3V \ J41
Run Transfert LMNE	TP67	R177	4.5V ±0.3V \ J37

4.5. Motor current adjustment

Check and adjust if necessary the motor current according to the following table.

Table 3: Motor current

Motor	Test Point	Potentiometer	Range
Sampling syringe	TP66	R114	2V ±0.05V
Carriage	TP65	R126	4.5V ±0.3V

4.6. Threshold adjustment

Check and adjust if necessary the threshold voltages according to the following table.

Table 4: Thresholds adjustment

Threshold	Test Point	Potentiometer	Range
Baso	TP14	R157	390mV ±5mV
RBC	TP13	R158	390mV ±5mV
Plt	TP2	R159	390mV ±5mV
LMNE CIS	TP3	R160	650mV ±5mV
LMNE OD	TP4	R161	350mV ±5mV

MDSS Technology pentra 80

Motor Board Adjustment Procedure

RAS332AA

ABX HORIBA DIAGNOSTICS

Concerns

Motor board adjustment:
- How to access to Motor board
- Motor board general view
- Motor board check and adjustment

Required tools

- Allen keys
- Voltmeter

Required products

None

Intervention time

15 min.

Frequency

On request

Specific kit or consumables

None

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

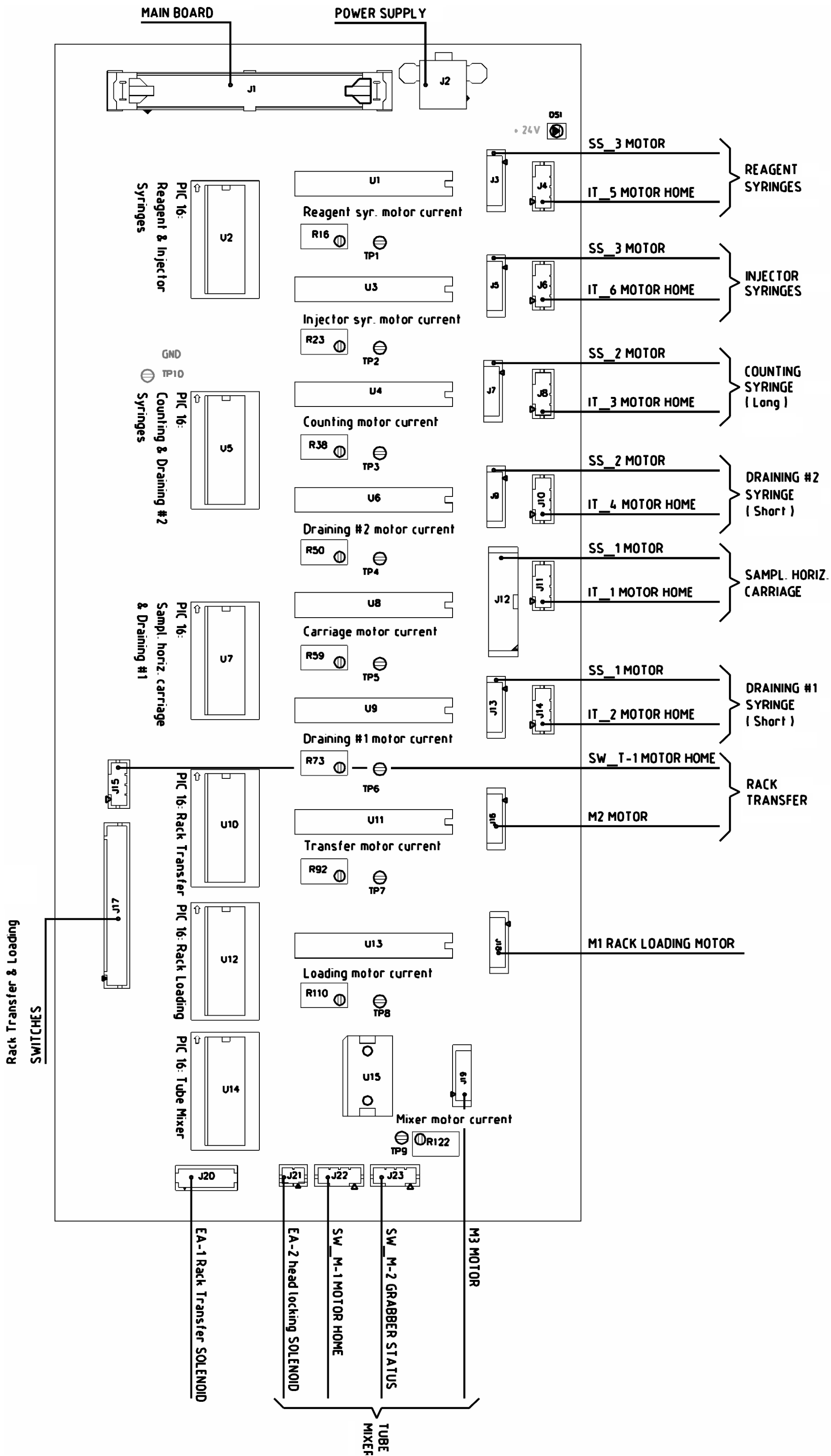
1. How to access to the Motor board

The motor board is located under the sampler loarder system on the lefthand side of the instrument.

- Lift up the reagent cover and remove the bottles.
- Remove the plastic protection under the reagents.
- Remove the lefthand side panel of the instrument (4 screws).
- Remove the reagent frame under the plastic protection (5 screws).
- Remove the sampler loader inox plate (4 screws).
- Remove the motor board plastic protection (2screws).

For more details about the dismantling of the instrument covers refer to procedure RAS342 Front panel & Covers dismantling.

2. Motor board general view


MAIN BOARD
POWER SUPPLY
J1
J2
DS1
+24V
SS_3 MOTOR
IT_5 MOTOR HOME
REAGENT SYRINGES
SS_3 MOTOR
IT_6 MOTOR HOME
INJECTOR SYRINGES
SS_2 MOTOR
IT_3 MOTOR HOME
COUNTING SYRINGE (Long)
SS_2 MOTOR
IT_4 MOTOR HOME
DRAINING #2 SYRINGE (Short)
SS_1 MOTOR
IT_1 MOTOR HOME
SAMPL. HORIZ. CARRIAGE
SS_1 MOTOR
IT_2 MOTOR HOME
DRAINING #1 SYRINGE (Short)
SW_T-1 MOTOR HOME
M2 MOTOR
RACK TRANSFER
M1 RACK LOADING MOTOR
U1
Reagent syr. motor current
R16
TP1
U3
Injector syr. motor current
R23
TP2
U4
Counting motor current
R38
TP3
U6
Draining #2 motor current
R50
TP4
U8
Carriage motor current
R59
TP5
U9
Draining #1 motor current
R73
TP6
U11
Transfer motor current
R92
TP7
U13
Loading motor current
R110
TP8
U15
Mixer motor current
TP9
R122
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
J13
J14
J15
J16
J17
J18
J19
J20
J21
J22
J23
U2
PIC 16: Reagent & Injector Syringes
GND
TP10
U5
PIC 16: Counting & Draining #2 Syringes
U7
PIC 16: Sampl. horiz. carriage & Draining #1
U10
PIC 16: Rack Transfer
U12
PIC 16: Rack Loading
U14
PIC 16: Tube Mixer
Rack Transfer & Loading SWITCHES
EA-1 Rack Transfer SOLENOID
EA-2 head locking SOLENOID
SW_M-1 MOTOR HOME
SW_M-2 GRABBER STATUS
M3 MOTOR
TUBE MIXEF

Diag.1:Motor board general view

3. Motor board check and adjustment

Table 1: Motor board check and adjustment target values

Motor	Test Point	Potentiometer	Target
Reagent syringe	TP1	R16	4V ±0.05V
Optical bench syringe	TP2	R23	3V ±0.05V
Counting syringe	TP3	R38	4V ±0.05V
Draining syringe #2	TP4	R50	4V ±0.05V
Horizontal carriage	TP5	R59	3V ±0.05V
Draining syringe	TP6	R73	4V ±0.05V
Sampler	TP7	R92	3.5V ±0.05V
Loader	TP8	R110	3.5V ±0.05V
Mixer (μ step motor)	TP9	R122	0.6V ±0.05V

MDSS Technology pentra 80

Temperature Adjustment Procedure

RAS333AA

HORIBA
DIAGNOSTICS

- Concerns

  Reagent heating coil and Thermostatic compartment temperature adjustment.

- Required tools

  - Thermometer

- Required products

  None

- Intervention time

  30 min.

- Frequency

  On request

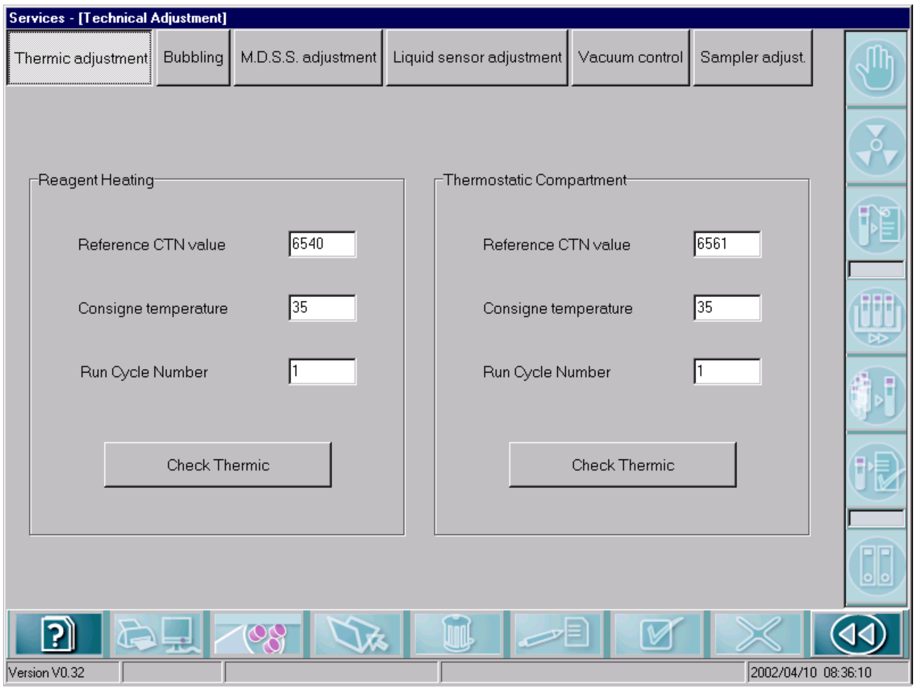
- Specific kit or consumables

  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Reagent Heating Coil Check & Adjustment

Start the instrument.
Enter menu **Service\Technician\Measurement\Gain**.
The following screen is displayed (See “Thermic adjustment window”, page 2).


Services - [Technical Adjustment]
Thermic adjustment
Bubbling
M.D.S.S. adjustment
Liquid sensor adjustment
Vacuum control
Sampler adjust.
Check Thermic
Check Thermic

Reagent Heating

Reference CTN value: 6540
Consigne temperature: 35
Run Cycle Number: 1

Thermostatic Compartment

Reference CTN value: 6561
Consigne temperature: 35
Run Cycle Number: 1

Version V0.32
2002/04/10 08:36:10

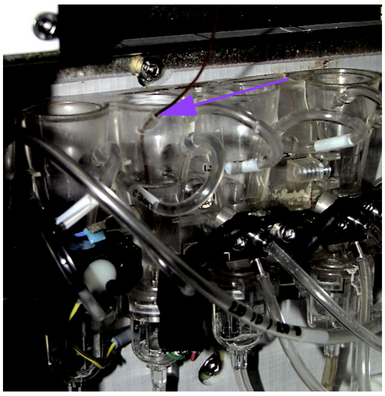
Diag.1:Thermic adjustment window

Reagent Heating:
- **Reference CTN value**: Input the CTN constant in this field.
- **Consigne temperature**: Allows to modify the temperature instruction.
- **Run Cycle Number**: Number of cycles to check temperature adjustment.

This control must be made with the thermal door closed and under stabilised thermic conditions (At least 5 minutes after startup).

1.1. Reagent heating coil temperature check

Open the thermal door on the righthand side of the instrument.
Plunge deeply the thermometer probe through the LMNE chamber’s inlet 1 (See “Reagent heating coil thermometer’s sensor installation”, page 2).



Diag.2:Reagent heating coil thermometer’s sensor installation

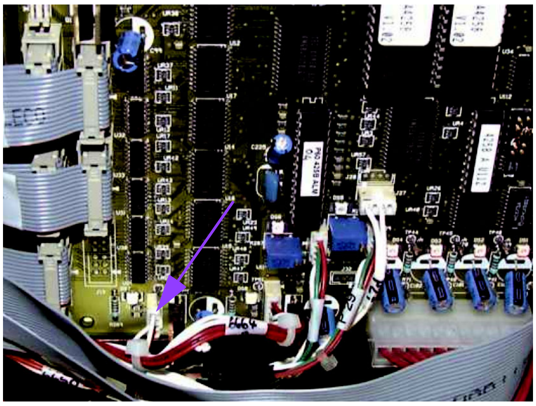
⚠ Make sure the thermometer sensor is deeply plunged into the liquid.

After thermometer probe is installed, close the thermal door.
Enter in **Run Cycles Number** field (in the **Reagent heating** area of the window), 5 cycles to run.
Press **Check Thermic** (in the **Reagent heating** area of the window) button to start control.
At every «bip» your ear from the machine, check the temperature is around **35°C ±1°C**.

⚠ Check is validated if you get during control at least 10 times the right temperature.
If an adjustment is necessary, when heating block has been changed for example, perform the following point of this procedure.

1.2. Reagent heating coil temperature adjustment

Check and eventually change the CTN value (See “Main Board Reagent heating coil CTN value”, page 3).



Diag.3:Main Board Reagent heating coil CTN value

The Heating coil CTN value is located on the CTN wire, close to the main board, connected on J31. Be sure to read the correct value as the sticker may be up or down.

Adjust, as described for the control, the temperature by the mean of the **Consigne temperature** value in the **Thermic adjustment** window (See “Thermic adjustment window”, page 2).
Consigne temperature value (in the **Reagent heating** area of the window) must be rounded (ex.: 34,35,36...):

- If **Consigne temperature** is increased, reagents preheating temperature increases.
- If **Consigne temperature** is decreased, reagents preheating temperature decreases.

Make a Reagent heating coil check after the adjustment as descibed at the beginning of the procedure.

If required change the **Consigne temperature** value (in the **Reagent heating** area of the window) and check temperature again until you get an acceptable temperature.

2. Thermostatic compartment temperature check and adjustment

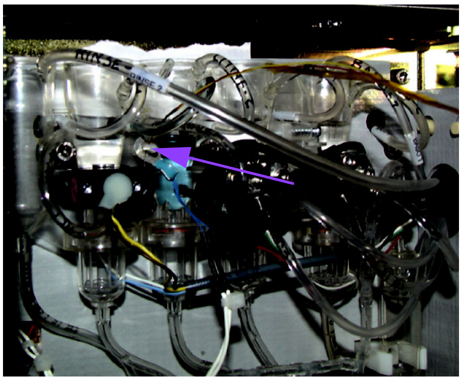
2.1. Thermostatic compartment temperature check

Start the instrument
Enter menu **Service\Technician\Measurement\Gain**.
The Thermic adjustment window is displayed (See “Thermic adjustment window”, page 2).

This control must be made with the thermal door closed and under stabilised thermic conditions (At least 5 minutes after startup).

Open the thermal door on the righthand side of the instrument.

Put the thermometer sensor in the CTN sensor (See “Thermostatic compartment thermometer’s sensor installation”, page 4).



Diag.4:Thermostatic compartment thermometer’s sensor installation

After thermometer probe is installed, close the thermal door.

Enter in **Run Cycles Number** field (in the **Thermostatic compartment** area of the window), 5 cycles to run.

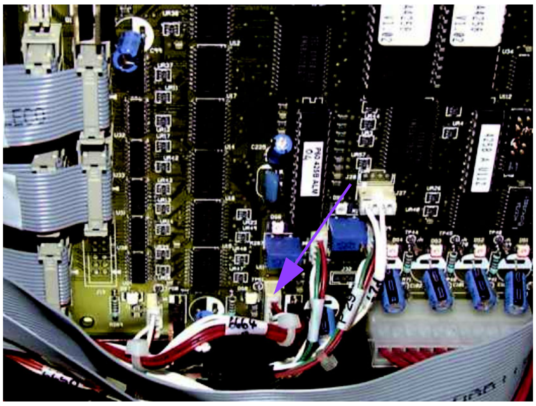
Press **Check Thermic** (in the **Thermostatic compartment** area of the window) button to start control.

At every «bip» your ear from the machine, check the temperature is around **35°C ±1°C**.

Check is validated if you get during control at least 10 times the right temperature.
If an adjustment is necessary, when heating block has been changed for example, perform the following point of this procedure.

2.2. Thermostatic compartment temperature adjustment

Check and eventually change the CTN value (See “Main Board Thermostatic compartment CTN value”, page 4).



Diag.5:Main Board Thermostatic compartment CTN value

The Thermostatic compartment CTN value is located on the CTN wire, close to the main board, connected on J33. Be sure to read the correct value as the sticker may be up or down.

Adjust, as described for the control, the temperature by the mean of the **Consigne temperature** value in the **Thermic adjustment** window (See “Thermic adjustment window”, page 2).

Consigne temperature value (in the **Thermostatic compartment** area of the window) must be rounded (ex.: 34,35,36...):

- If **Consigne temperature** is increased, reagents preheating temperature increases.

- If **Consigne temperature** is decreased, reagents preheating temperature decreases.

Make a Thermostatic compartment temperature check after the adjustment as descibed at the previously in this procedure.

If required change the **Consigne temperature** value and check temperature again until you get an acceptable temperature.

Vacuum Adjustment Procedure

RAS334AA

- Concerns

  Counting and draining 1 & 2 syringes vacuum control and adjustement

- Required tools

  - Allen keys
  - Barflex
  - Flat screws drivers

- Required products

  None

- Intervention time

  15 min.

- Frequency

  On request

- Specific kit or consumables

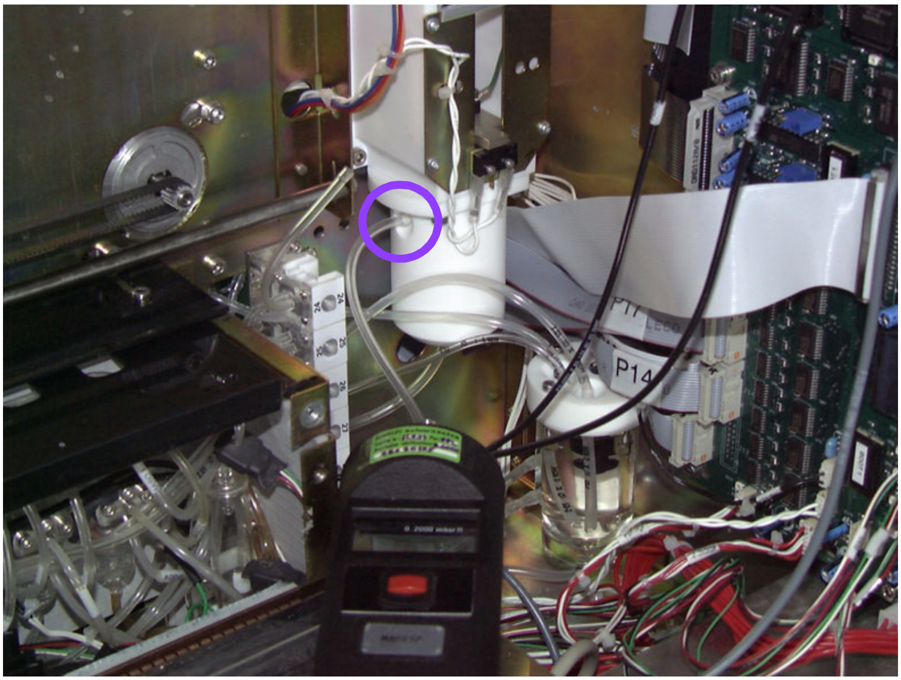
  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Draining syringe vacuum check (No adjustment available).

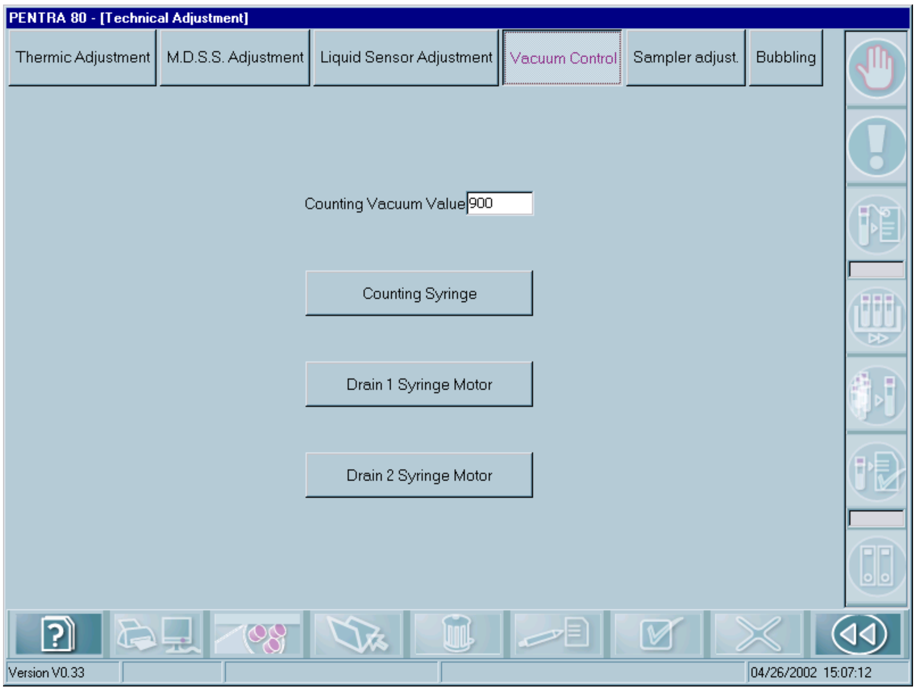
1.1. Draining syringe 1.

Remove cover (See RAS342 procedure).
Disconnect the tube on the draining syringe 1 (inlet 1) and replace it by the Barflex tube. (See Diag.1 “Draining syringe 1”, page 2).



Diag.1 Draining syringe 1

Enter **Menu\Service\Menu Technician\Gains\Vacuum control**. (See Diag.2 “Vacuum control”, page 2).

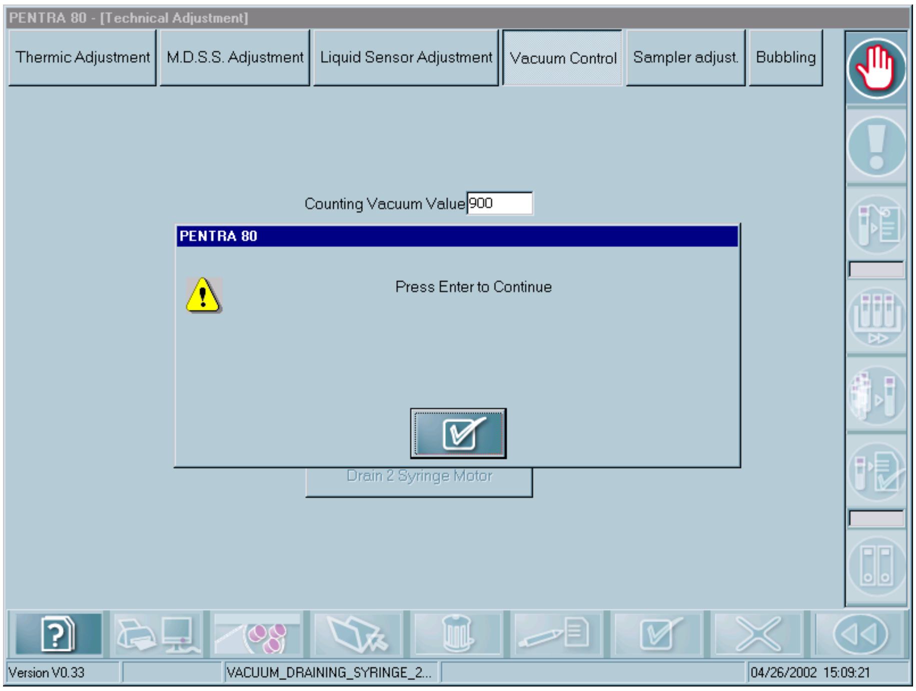

PENTRA 80 - [Technical Adjustment]

Counting Vacuum Value 900

Thermic Adjustment
M.D.S.S. Adjustment
Liquid Sensor Adjustment
Vacuum Control
Sampler adjust.
Bubbling
Counting Syringe
Drain 1 Syringe Motor
Drain 2 Syringe Motor
Version V0.33
04/26/2002 15:07:12

Diag.2 Vacuum control

Press «**Draining syringe 1**»
Check vacuum on the Barflex, vacuum must be around **260 mb** and must be **stable**.
Press **OK** button (See Diag.3 “Validate”, page 3).


PENTRA 80 - [Technical Adjustment]
Thermic Adjustment
M.D.S.S. Adjustment
Liquid Sensor Adjustment
Vacuum Control
Sampler adjust.
Bubbling
PENTRA 80
Drain 2 Syringe Motor
Version V0.33
VACUUM_DRAINING_SYRINGE_2...
04/26/2002 15:09:21

Counting Vacuum Value 900

Press Enter to Continue

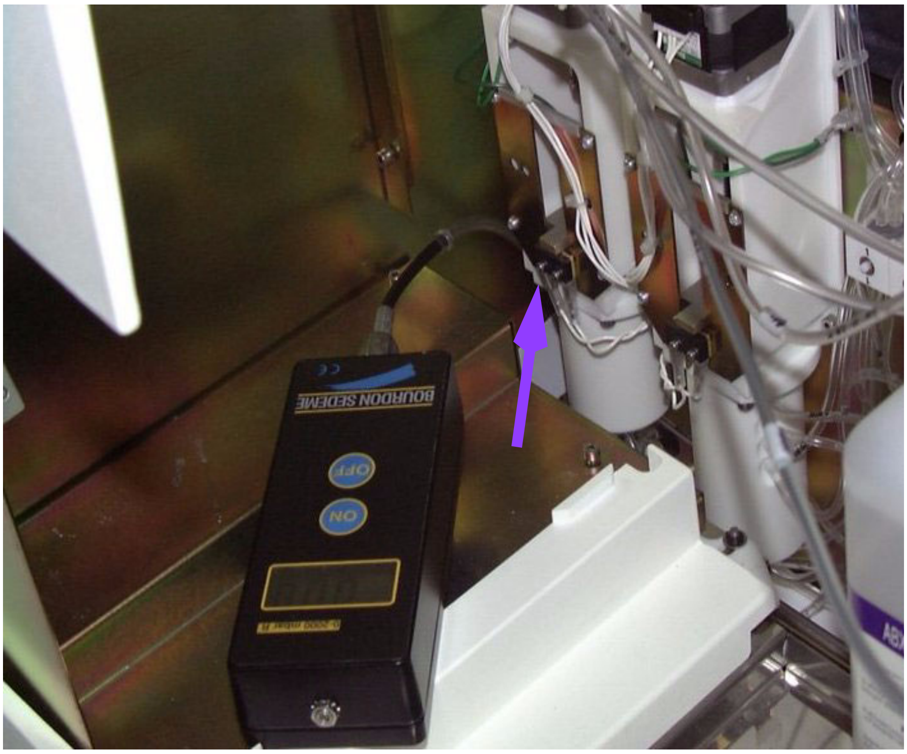
Diag.3 Validate

Disconnect the Barflex and connect the tube back on the draining syringe 1.

If vacuum is not stable or too low, check vacuum circuit (tubings, valves,syringe or O’ring) and repair if necessary.

1.2. Draining syringe 2.

Disconnect the tube on the draining syringe 2 (inlet 1) and replace it by the Barflex tube. (See Diag.4 “Draining syringe 2”, page 4).



Diag.4 Draining syringe 2

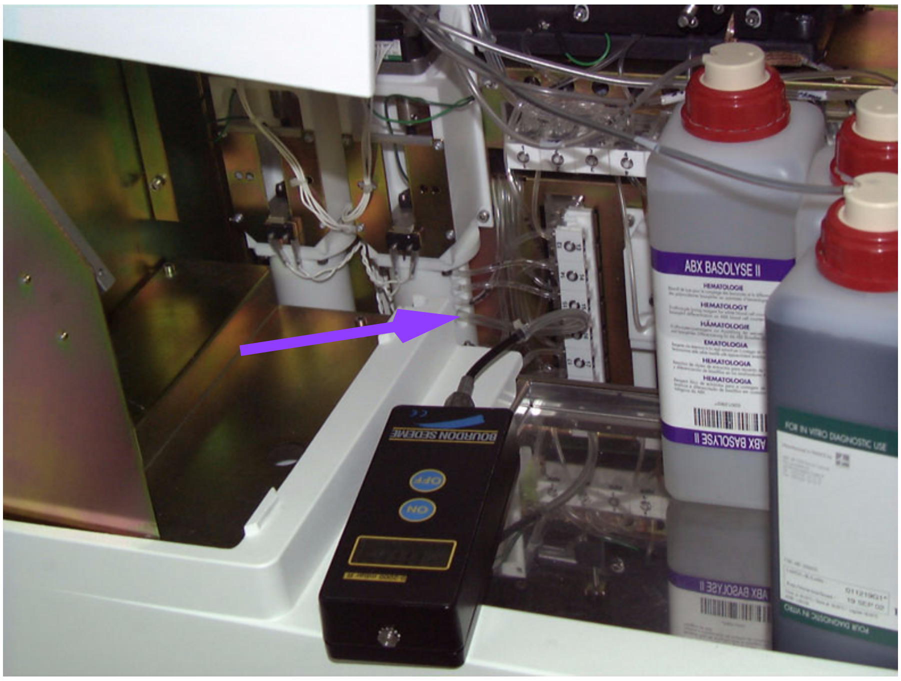
Enter **Menu\Service\Menu Technician\Gains\Vacuum control**. (See Diag.2 “Vacuum control”, page 2).

Press «**Draining syringe 2**»
Check vacuum on the Barflex, vacuum must be around 260 mb and must be stable.
Press **OK** button (See Diag.3 “Validate”, page 3).
Disconnect the Barflex and connect the tube back on the draining syringe 2.

2. Counting syringe vacuum check and adjustment.

2.1. Counting syringe vacuum check.

Remove cover (See RAS342 procedure).
Disconnect the lowest tube (inlet 4) on the counting syringe and replace it by the barflex tube. (See Diag.5 “Counting syringe”, page 5).

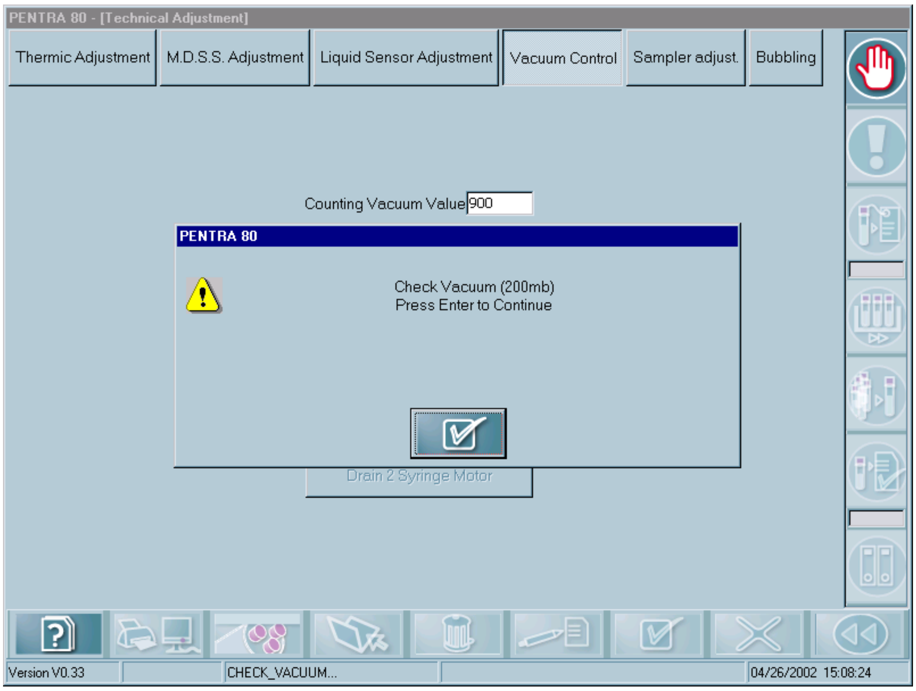


Diag.5 Counting syringe

Enter **Menu\Service\Menu Technician\Gains\Vacuum control.** (See Diag.2 “Vacuum control”, page 2).

Press «**Counting syringe**».

Check vacuum on the Barflex while the following screen is displayed. (See Diag.6 “Check and validate”, page 5), Vacuum must be at 200mb.



PENTRA 80 - [Technical Adjustment]
Thermic Adjustment
M.D.S.S. Adjustment
Liquid Sensor Adjustment
Vacuum Control
Sampler adjust.
Bubbling
Drain 2 Syringe Motor
Version V0.33
CHECK_VACUUM...
04/26/2002 15:08:24

Counting Vacuum Value 900

PENTRA 80

Check Vacuum (200mb)
Press Enter to Continue

Diag.6 Check and validate

Press **OK** button.

Disconnect the Barflex and connect the tube back on the counting syringe.

2.2. Counting syringe vacuum adjustment.

Follow the «Counting syringe vacuum check» procedure (See above).
Change the **Vacuum value** (motor step). If vacuum is too low, increase step value.
Repeat vacuum check and step value adjustment until you get the correct vacuum (200mb).
Disconnect the Barflex and connect the tube back on the counting syringe.

MDSS Technology pentra 80

Bubbling Adjustment Procedure

RAS335AA

- Concerns

  Bubbling adjustment.

- Required tools

  None

- Required products

  None

- Intervention time

  15 min.

- Frequency

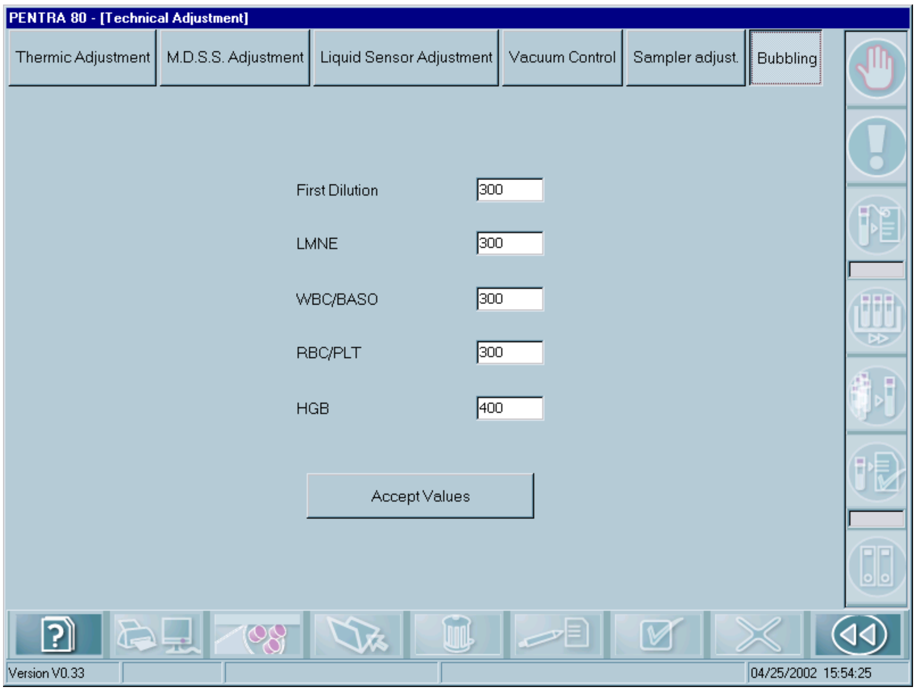
  On request

- Specific kit or consumables

  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Bubbling is factory adjusted and normally does not required further adjustment.
If an adjustment is necessary, follow this procedure.
Enter **Menu\Service\Menu Technician\Gains\Bubbling** (See Diag.1 “Bubbling”, page 2).


PENTRA 80 - [Technical Adjustment]
Thermic Adjustment
M.D.S.S. Adjustment
Liquid Sensor Adjustment
Vacuum Control
Sampler adjust.
Bubbling
Accept Values

First Dilution 300

LMNE 300

WBC/BASO 300

RBC/PLT 300

HGB 400

Version V0.33

04/25/2002 15:54:25

Diag.1 Bubbling

Enter new step value for each bubbling, and click «Accept Values».

To increase bubbling, increase the number of steps.
To decrease bubbling, decrease the number of steps.

Bubbling	Low limit	Normal	Hight limit
FIRST DILUTION	100	300	400
LMNE	100	300	400
WBC/BASO	100	300	400
RBC/PLT	100	300	400
HGB	300	400	500

MDSS Technology pentra 80

LMNE Flowcell Adjustment Procedure

RAS336AA

ABX HORIBA DIAGNOSTICS

Concerns

Instrument adjustment : LMNE Flowcell

Required tools

- Allen keys
- Flat screw driver

Required products

- Latex
- Fresh blood sample
- Calibrator

Intervention time

1h

Frequency

On request

Specific kit or consumables

None

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

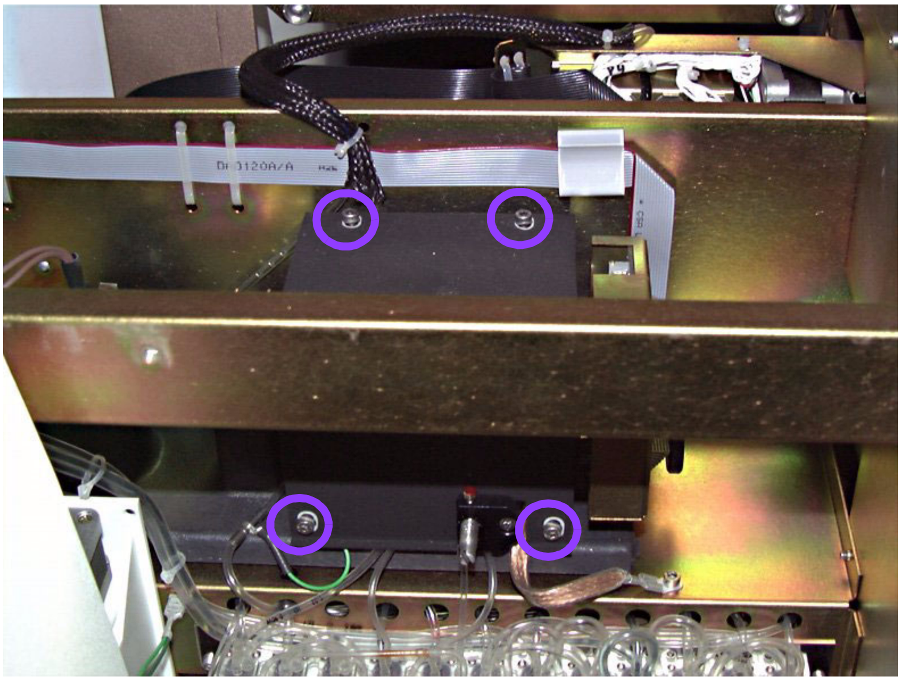
1. LMNE Flowcell adjustment check.

This adjustment procedure must be carried out when LMNE flowcell is moved or replaced, or when LMNE tube is changed. No adjustment is required when LMNE lampe is replaced.

Enter : **Menu /Service/Menu technician/Measurment/LMNE adjustment** allows the adjustment of the entire optical bench parameters. A 1/400th dilution of RBC/PLT latex is prepared (5µl of Latex, 1ml of diluent, 1ml of eosinofix) in the LMNE chamber. This dilution is then transfered toward the optical chamber and injected.
The measurments are continuously displayed every 700ms during a total of 27 seconds.

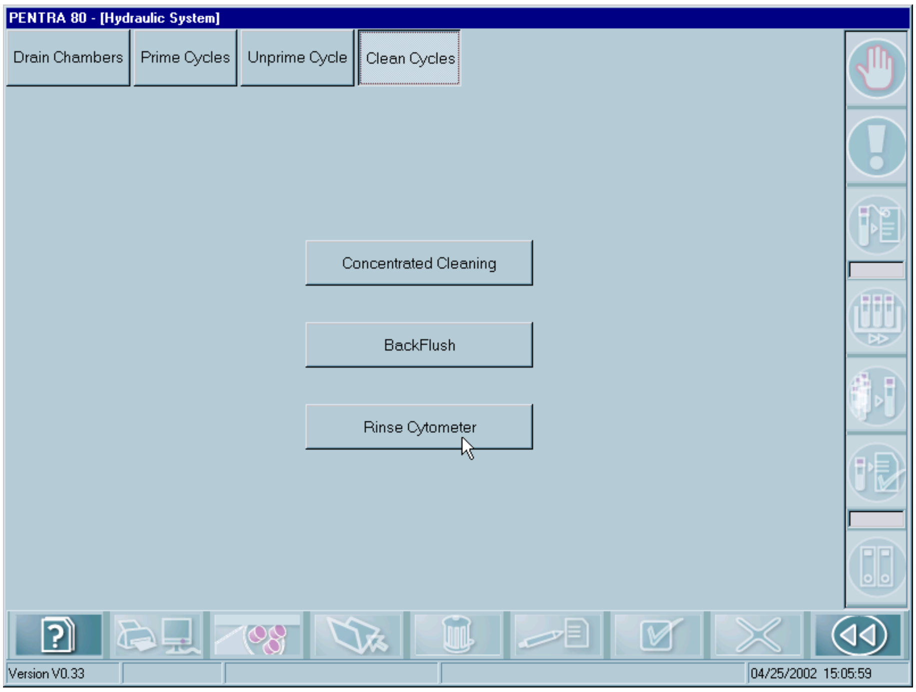
⚠ Never dismantle Emission gun or even unlock it. The adjustment is factory made and cannot be performed in the field.

Remove the cover (See RAS342).
Unscrew the cover of the optical bench (See Diag.1 “Optical bench cover”, page 2).



Diag.1 Optical bench cover

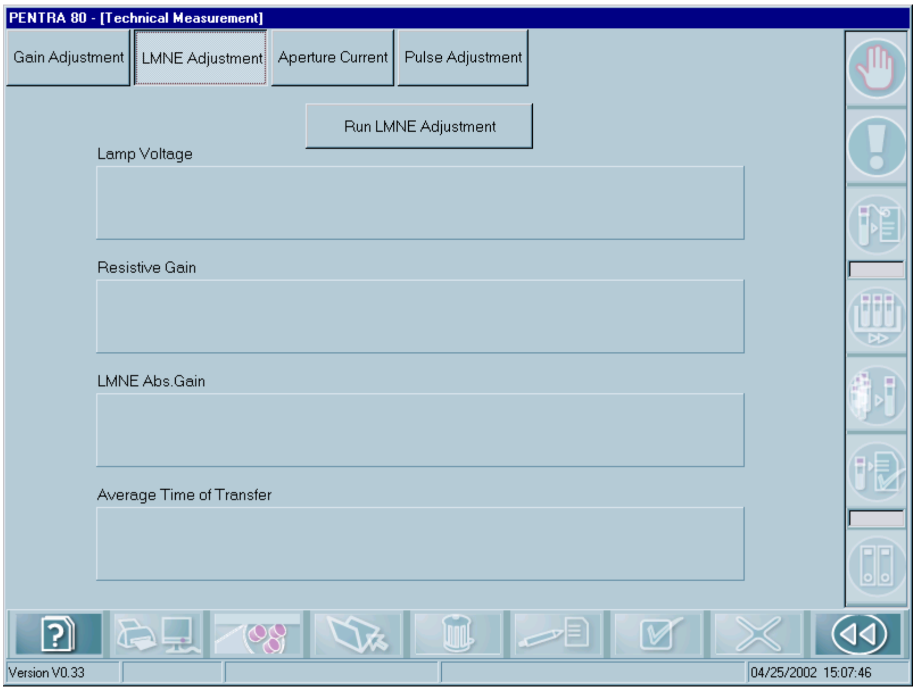
Run a **Rinse cytometer** cycle to get ride of air bubbles stuck to the inner optical surfaces.
Enter : **Menu/Menu Superuser/Hydraulic/Clean cycle/Rinse cytometer** (See Diag.2 “Clean cycle”, page 3).


PENTRA 80 - [Hydraulic System]
Drain Chambers
Prime Cycles
Unprime Cycle
Clean Cycles
Concentrated Cleaning
BackFlush
Rinse Cytometer
Version V0.33
04/25/2002 15:05:59

Diag.2 Clean cycle

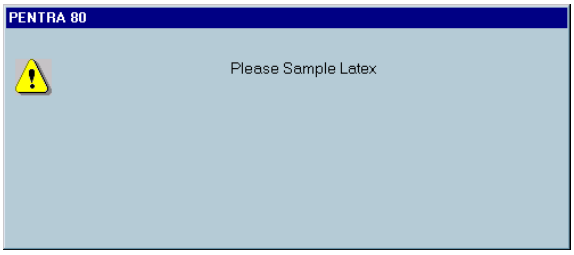
Check that the flowcell contains no or just a very few air bubbles.

Enter : **Menu/service/menu technician/measurment/LMNE adjustment** (See Diag.3 “LMNE adjustment”, page 3)


PENTRA 80 - [Technical Measurement]
Gain Adjustment
LMNE Adjustment
Aperture Current
Pulse Adjustment
Run LMNE Adjustment
Lamp Voltage
Resistive Gain
LMNE Abs.Gain
Average Time of Transfer
Version V0.33
04/25/2002 15:07:46

Diag.3 LMNE adjustment

Mix the RBC/PLT latex thorougly.
Click on «**Run LMNE Adjustment**» button.
Closed tube holder when the following screen appears :(See Diag.4 “Sample the latex”, page 4).

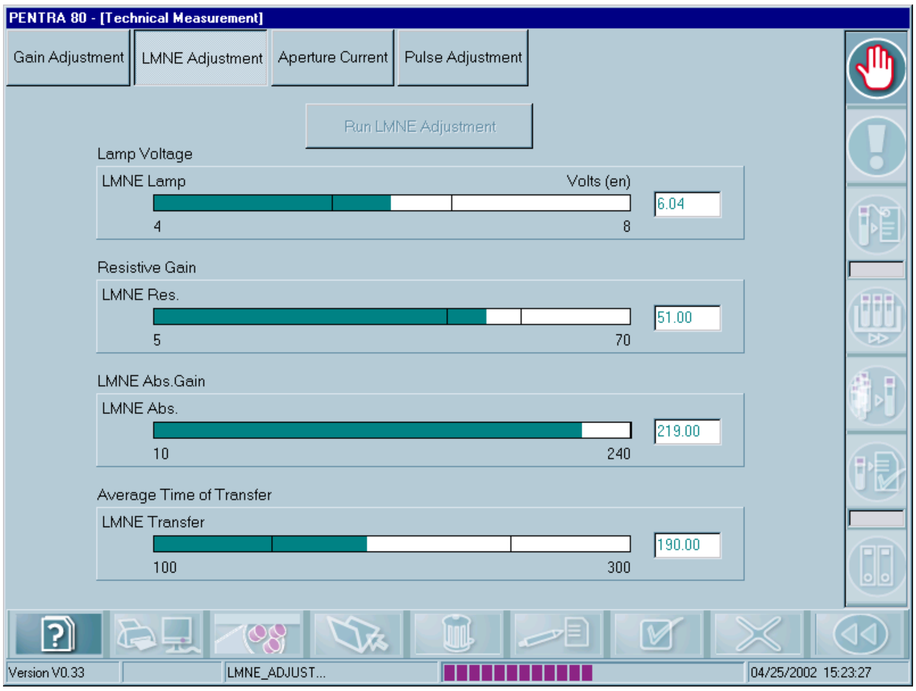


PENTRA 80

Please Sample Latex

Diag.4 Sample the latex

When optical bench is well adjusted : (See Diag.5 “LMNE adjustment screen”, page 4)



PENTRA 80 - [Technical Measurement]
Gain Adjustment
LMNE Adjustment
Aperture Current
Pulse Adjustment
Run LMNE Adjustment

Lamp Voltage

LMNE Lamp — Volts (en) — 4 to 8 — 6.04

Resistive Gain

LMNE Res. — 5 to 70 — 51.00

LMNE Abs.Gain

LMNE Abs. — 10 to 240 — 219.00

Average Time of Transfer

LMNE Transfer — 100 to 300 — 190.00

Version V0.33 | LMNE_ADJUST... | 04/25/2002 15:23:27

Diag.5 LMNE adjustment screen

Check that the displayed values are within the range.(See Table 1: “TARGET VALUES”, page 4).

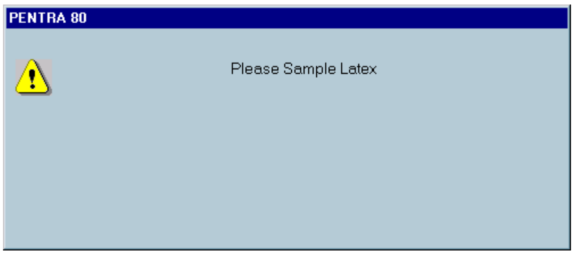
Table 1: TARGET VALUES

PARAMETER	TARGET VALUE	RANGE
LMNE LAMP	6.00V	5.50 to 6.50
TRANSFER TIME	200ms	150 to 250
RESISTIVE CHANNEL	50	45 to 55
ABSORBANCE CHANNEL	170	Set to maximum

If the values are out of range or to get a better adjustment,follow the LMNE flowcell adjustment procedure.

2. LMNE Flowcell position adjustment

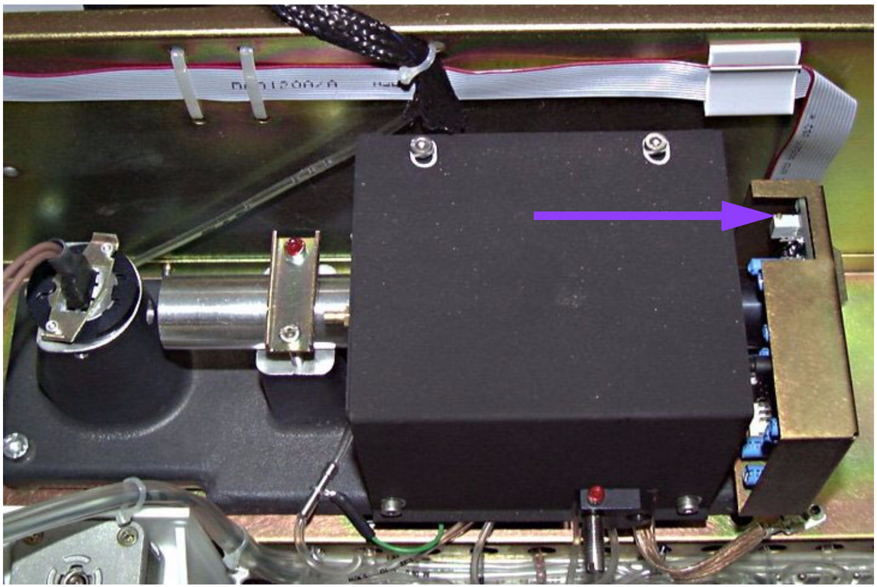
Enter : **Menu/service/menu technician/measurment/LMNE adjustment.**
Click on «**Run LMNE Adjustment**» button.
Closed tube holder when the following screen appears :(See Diag.6 “Sample the latex”, page 5)



Please Sample Latex

Diag.6 Sample the latex

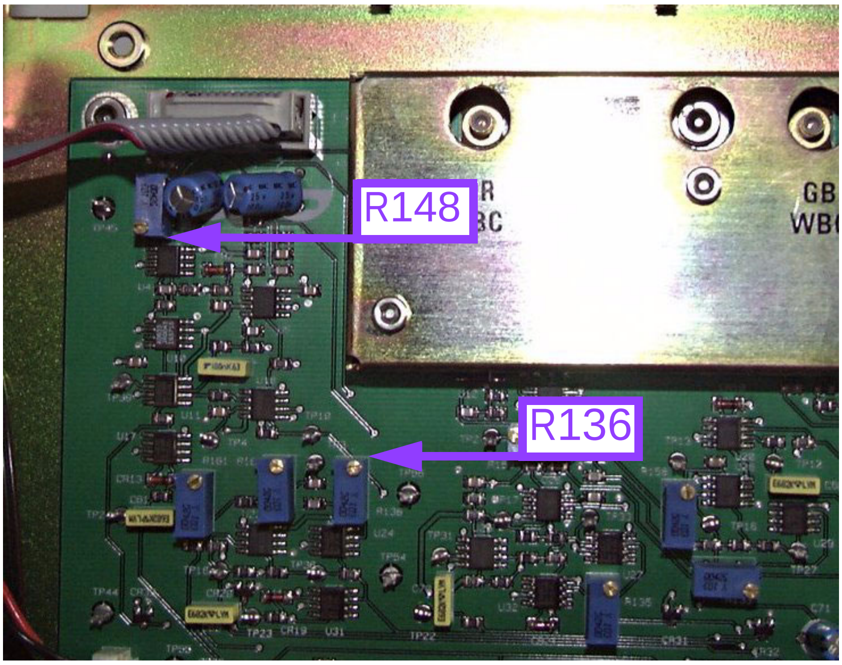
During the cycle, adjust **LMNE lamp voltage** around 6V by turning **R414** potentiometer, located on optical bench board.(See Diag.7 “Optical bench board”, page 5)



Diag.7 Optical bench board

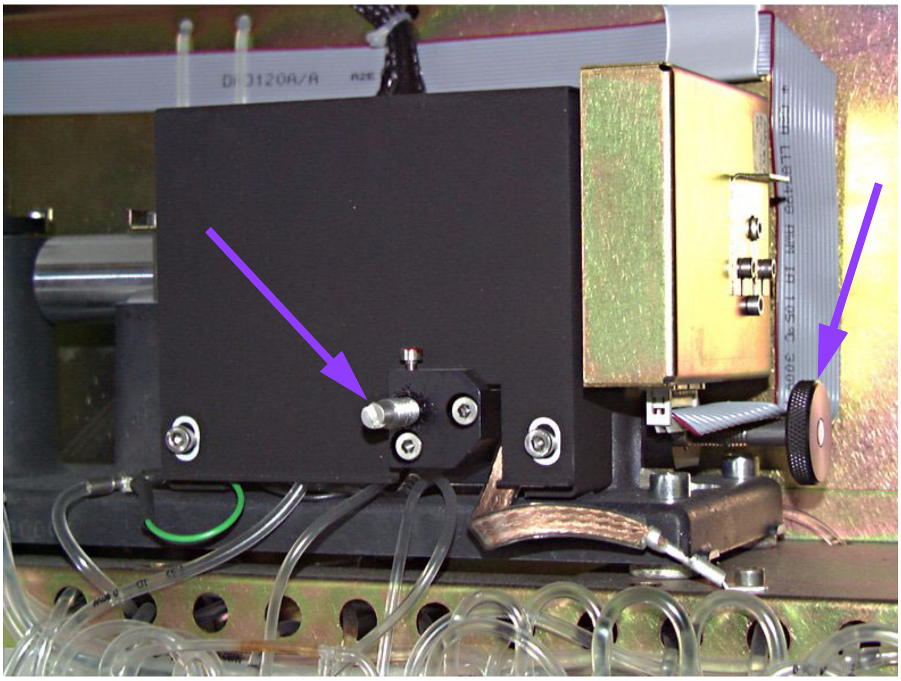
Test points on optical bench board, near R414 potentiometer , can be used to check 6V with a voltmeter.

Adjust **Resistive gain** (LMNE RES) to 50 by turning **R136** located on mother board (See Diag.8 “Mother board”, page 6).



Diag.8 Mother board

Adjust **Optical gain** (LMNE ABS) to the maximum (and above 170).
Adjustment is made by lateral or axial reception gun movement, use toothed wheel and lateral screw (See Diag.9 “Opical bench adjustment”, page 6).



Diag.9 Opical bench adjustment

If you have difficulties to adjust Absorbance, you can increase gain with **R148** potentiometer (See Diag.8 “Mother board”, page 6). Once you get the highest optical adjustment, decrease slowly gain (R148) to get a correct optical gain adjustment with normal fresh blood.

Check that **Transfer time** is in limits of range.

Transfer time is not adjustable and must be between 150 and 250.

Transfer time bargraph is used to ensure the correct Right/Left location of the light rectangle in the flowcell. When the optimal value is reached, the transfer time is around 200 because of the constant height betweens guns alignment and flowcell.
This height is garanted by the washer under the flowcell, always put them back even when the flowcell is remplaced by a new one.

Put the Optical bench cover back.

After intervention,check with normal fresh blood that you have a correct matrix.

MDSS Technology pentra 80

LMNE Balance Adjustment Procedure

RAS337AA

ABX HORIBA DIAGNOSTICS

- Concerns

  LMNE Balance calibration and forced calibration

- Required tools

  None

- Required products

  Fresh and normal blood samples (5 different samples at least)

- Intervention time

  15min

- Frequency

  On request

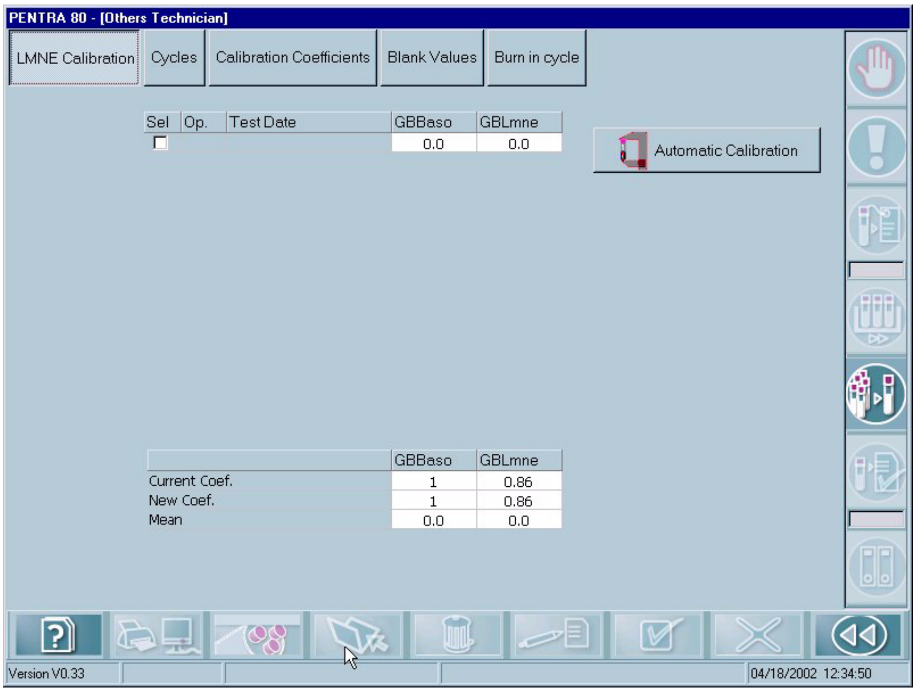
- Specific kit or consumables

  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

This procedure must be performed on a clean instrument.
If the instrument is suspected to not be perfectly clean, perform a Concentrated cleaning.

Enter Menu : **Service/Menu technician/others/LMNE calibration.**(See Diag.1 “LMNE menu”, page 2)


PENTRA 80 - [Others Technician]

Sel	Op.	Test Date	GBBaso	GBLmne
☐			0.0	0.0

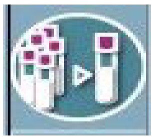
	GBBaso	GBLmne
Current Coef.	1	0.86
New Coef.	1	0.86
Mean	0.0	0.0

Version V0.33

04/18/2002 12:34:50

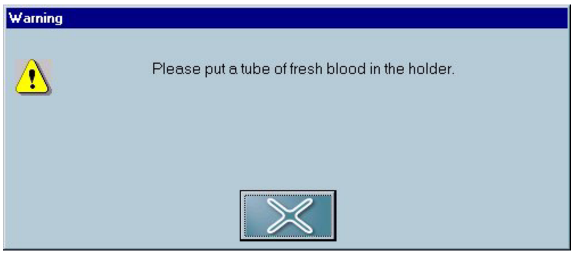
Diag.1 LMNE menu

Prepare a minimum of 5 different human blood samples without WBC alarm.
Press on «**Stat mode**» button (See Diag.2 “Stat mode button”, page 2)



Diag.2 Stat mode button

When the following screen appears (See Diag.3 “Fresh blood tube”, page 2), put one of the tube and close the tube holder.


Warning

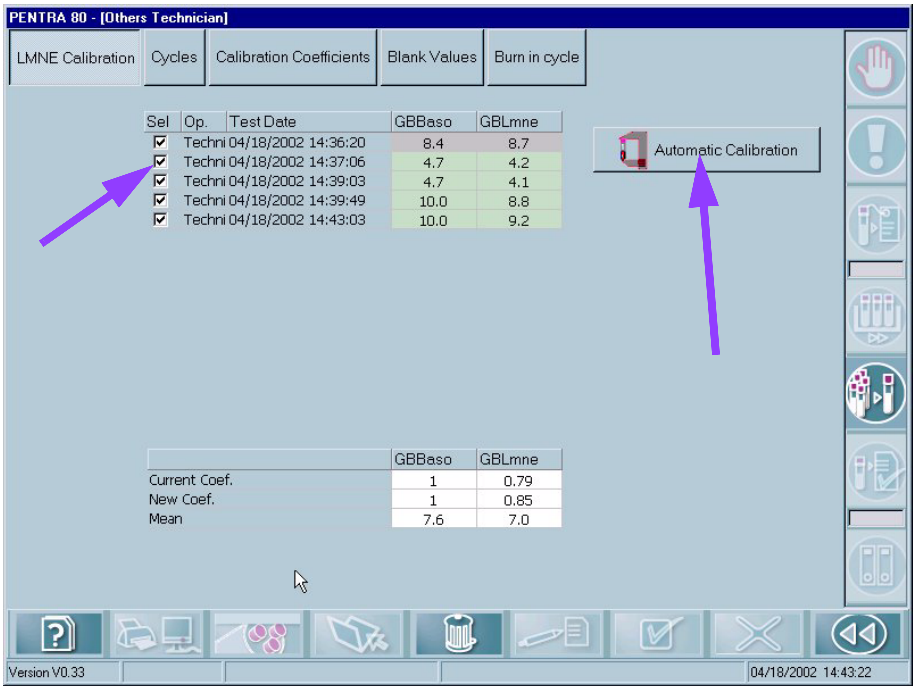
Please put a tube of fresh blood in the holder.

Diag.3 Fresh blood tube

When the analysis cycle ends, the first result is displayed on the result chart table.
When the tube holder is open, run an other specimen, and so until you get a minimum of 5 different results.

At least 5 results are necessary to calibrate the LMNE balance.

Select results to be involved in the statistical calculation by clicking the checked box in «Sel» column (See Diag.4 “Old coef”, page 3).
To discard a result from the statistical calculation, click the checked box again to remove the mark.


LMNE Calibration
Cycles
Calibration Coefficients
Blank Values
Burn in cycle
Automatic Calibration

PENTRA 80 - [Others Technician]

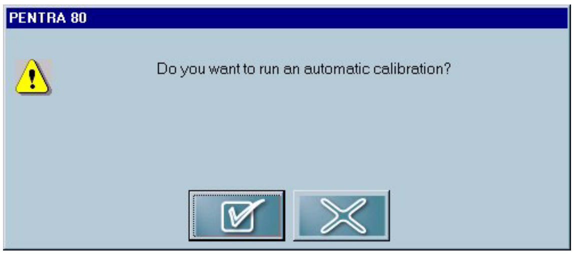
Sel	Op.	Test Date	GBBaso	GBLmne
☑	Techni	04/18/2002 14:36:20	8.4	8.7
☑	Techni	04/18/2002 14:37:06	4.7	4.2
☑	Techni	04/18/2002 14:39:03	4.7	4.1
☑	Techni	04/18/2002 14:39:49	10.0	8.8
☑	Techni	04/18/2002 14:43:03	10.0	9.2

	GBBaso	GBLmne
Current Coef.	1	0.79
New Coef.	1	0.85
Mean	7.6	7.0

Version V0.33
04/18/2002 14:43:22

Diag.4 Old coef

Click on «**auto calibration**» button (See Diag.4 “Old coef”, page 3) to apply new calibration coefficient.
When the following screen appears, click on «**OK**» button (See Diag.5 “Auto calibration screen”, page 3).

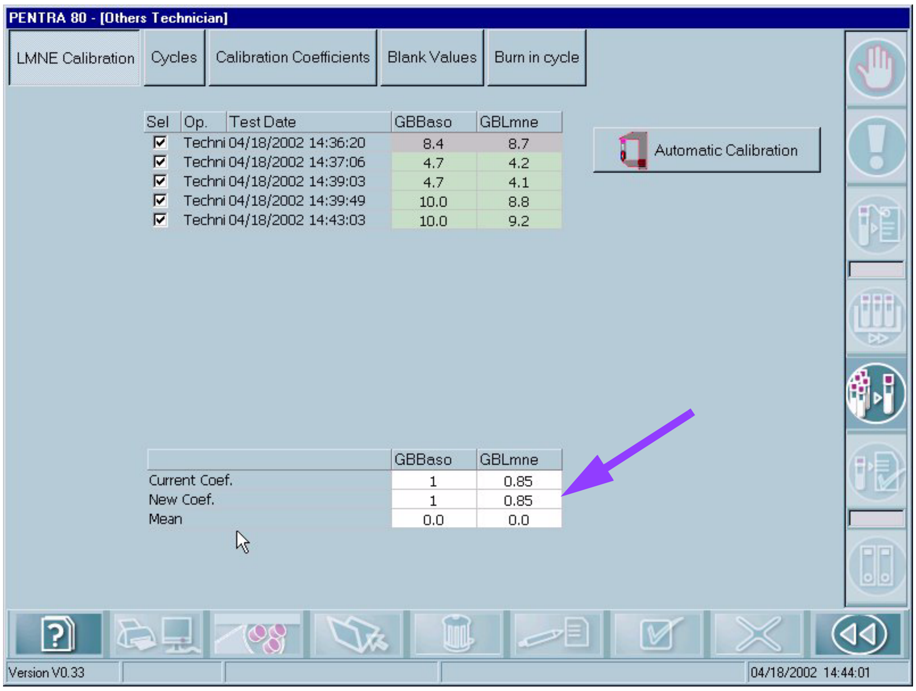


PENTRA 80

Do you want to run an automatic calibration?

Diag.5 Auto calibration screen

New LMNE Balance coefficient is applied to the instrument (See Diag.6 “New coef”, page 4).

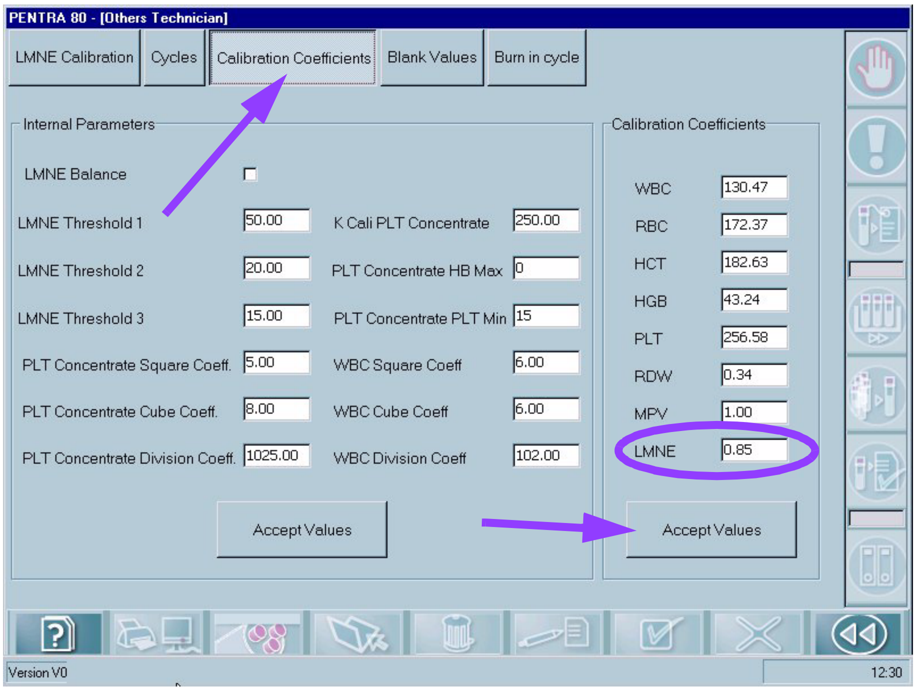

PENTRA 80 - [Others Technician]
LMNE Calibration
Cycles
Calibration Coefficients
Blank Values
Burn in cycle
Automatic Calibration
Version V0.33
04/18/2002 14:44:01

Sel	Op.	Test Date	GBBaso	GBLmne
☑	Techni	04/18/2002 14:36:20	8.4	8.7
☑	Techni	04/18/2002 14:37:06	4.7	4.2
☑	Techni	04/18/2002 14:39:03	4.7	4.1
☑	Techni	04/18/2002 14:39:49	10.0	8.8
☑	Techni	04/18/2002 14:43:03	10.0	9.2

	GBBaso	GBLmne
Current Coef.	1	0.85
New Coef.	1	0.85
Mean	0.0	0.0

Diag.6 New coef

LMNE balance coefficient can be modified in the software.
Press «Calibration coefficients» button,change LMNE value, then press «Accept Values» button (See Diag.7 “Calibration coefficients”, page 4).


PENTRA 80 - [Others Technician]
LMNE Calibration
Cycles
Calibration Coefficients
Blank Values
Burn in cycle
Internal Parameters
Calibration Coefficients
Accept Values
Accept Values
Version V0
12:30

Internal Parameters

LMNE Balance ☐
LMNE Threshold 1: 50.00
K Cali PLT Concentrate: 250.00
LMNE Threshold 2: 20.00
PLT Concentrate HB Max: 0
LMNE Threshold 3: 15.00
PLT Concentrate PLT Min: 15
PLT Concentrate Square Coeff.: 5.00
WBC Square Coeff: 6.00
PLT Concentrate Cube Coeff.: 8.00
WBC Cube Coeff: 6.00
PLT Concentrate Division Coeff.: 1025.00
WBC Division Coeff: 102.00

Calibration Coefficients

WBC: 130.47
RBC: 172.37
HCT: 182.63
HGB: 43.24
PLT: 256.58
RDW: 0.34
MPV: 1.00
LMNE: 0.85

Diag.7Calibration coefficients

MDSS Technology pentra 80

Tube holder adjustment Procedure

RAS338AA

ABX HORIBA DIAGNOSTICS

- Concerns

  Tube holder general view
  Tube holder assembly replacement
  Tube holder adjustments
  Needle adjustment
  Adjustment check
  Compatible tube list

- Required tools
  - Allen keys
  - Flat screwdriver

- Required products

  None

- Intervention time

  1h.

- Frequency

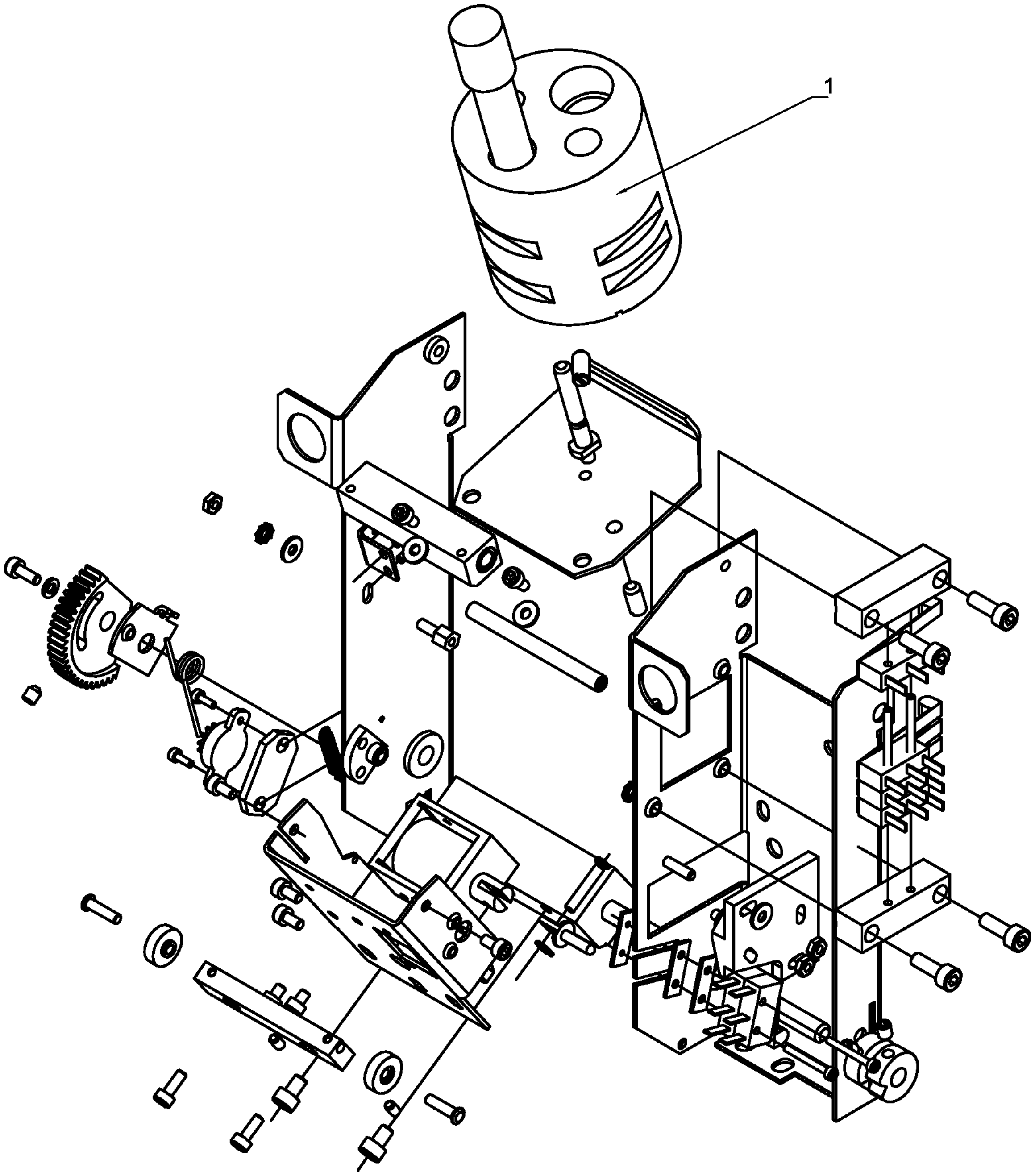
  On request

- Specific kit or consumables

  Tube holder assembly: **XDA728A**

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Tube holder general view



Diag.1:Tube holder exploded view

2. Tube holder assembly replacement

Switch the instrument off.

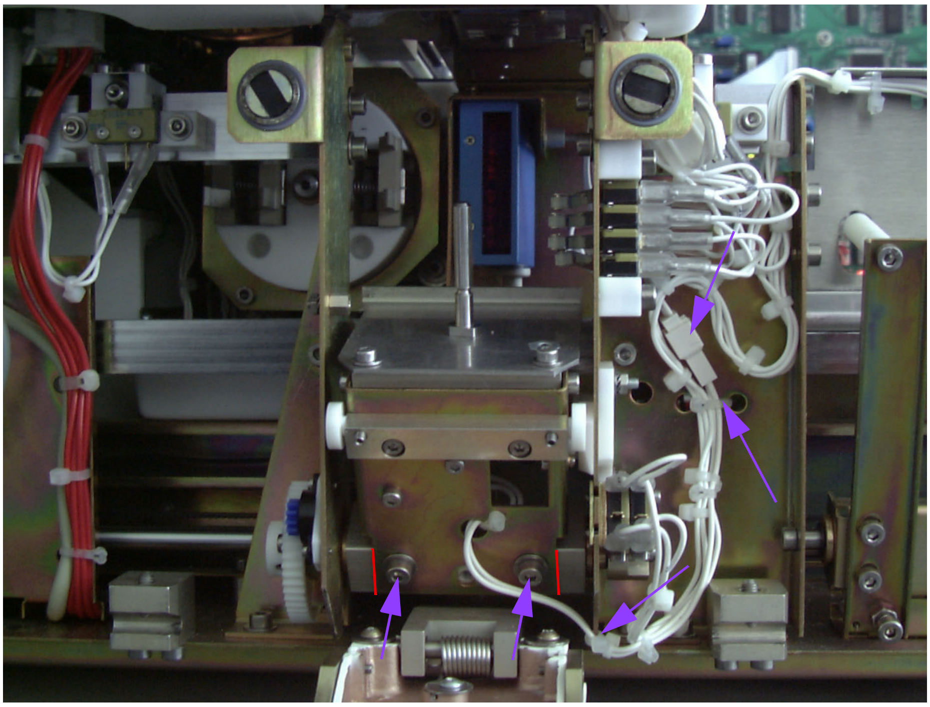
Remove the 2 front doors.

Push electromagnet axis to free and open the tube holder, remove the tube holder.

Cut the 2 tyraps and disconnect the electro-magnet command (See Diag.2:“Tube holder dimantling ”, page 3).

Before dismantling the tube holder, mark with a pen the location of the tube holder support (Example: Red lines, See Diag.2:“Tube holder dimantling ”, page 3)

Unscrew the 2 fixation screws (See Diag.2:“Tube holder dimantling ”, page 3).



Diag.2:Tube holder dimantling

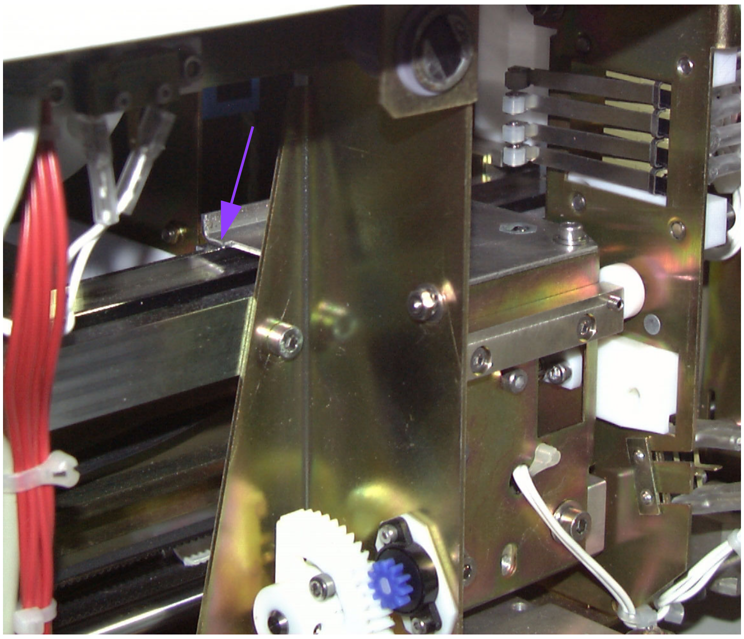
Remove the tube holder assembly.

Install the new tube holder assembly at the same place (Use the marks previously done).

Tight gently tube holder fixations screws.

Plug the electro-magnet command connector and replace the tyraps.

Close the tube holder to sampling position and check the tube holder axis support touch the rail behind (See Diag.3:“Tube holder pre-adjustment ”, page 3).



Diag.3:Tube holder pre-adjustment

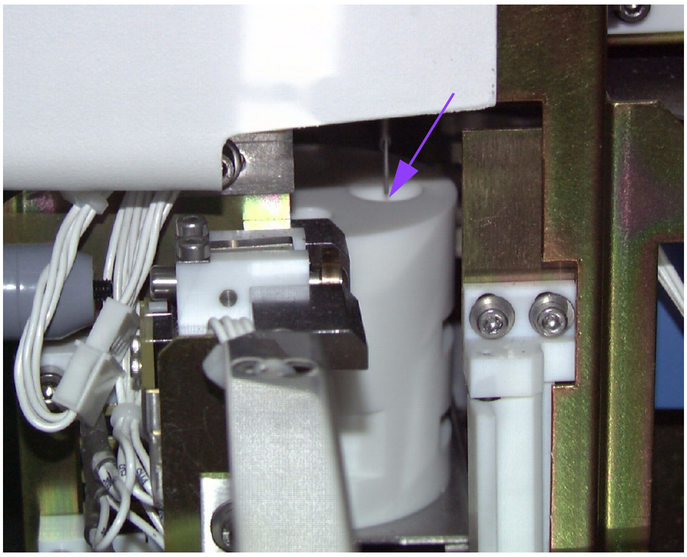
If necessary adjust, by the mean of the 2 screws (See Diag.2:“Tube holder dimantling ”, page 3), the position of the tube holder assembly to get a correct adjustment.

3. Tube holder adjsutments

Switch the instrument on and log as «technician».

From menu: **Services\Technician menu\Gains\MDSS Adjustment\Holder Adjustment**, press **Control** button.

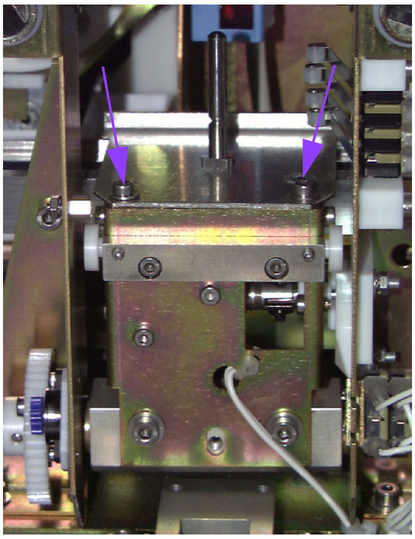
Put the tube holder back then close the door and check that the needle is correctly centered inside one of the tube holder's sampling hole (Position 1 for example).



Diag.4:Tube holder centering check

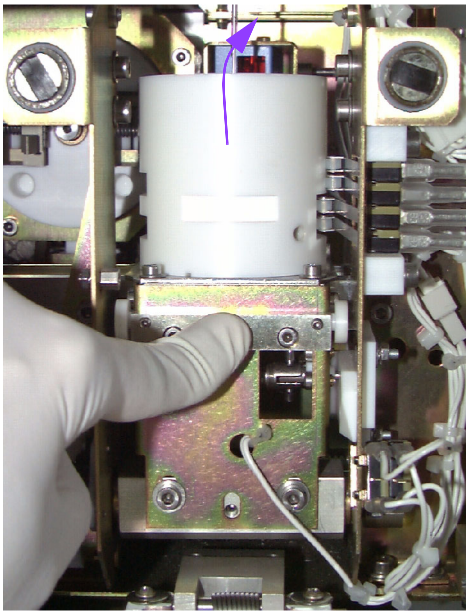
If not adjust the tube holder position as follows:

- Untight the 2 screws of the tube holder axis support (See Diag.5:"Tube holder centering adjsutment ", page 4).
- Adjust the tube holder axis support in order to get a correct position of the tube holder and the needle.
- When done gently tight the 2 screws (See Diag.5:"Tube holder centering adjsutment ", page 4).
- Open the tube holder.
- Finaly tight the 2 screws (See Diag.5:"Tube holder centering adjsutment ", page 4) and check adjustment again. Repeat until you get a correct adjsutment.



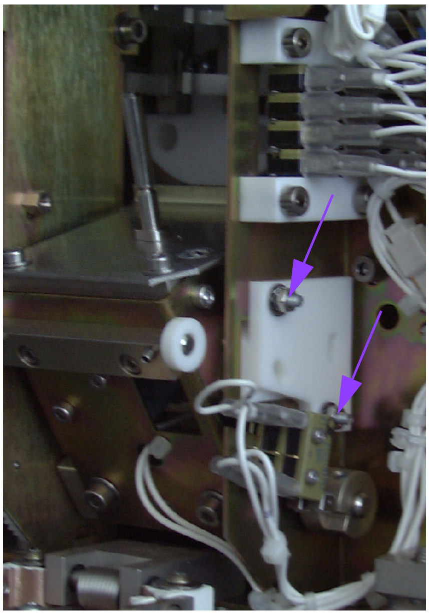
Diag.5:Tube holder centering adjsutment

The tube holder must have a little play (about 1mm.) after the sampling position, if not the tube holder may not open correctly, check the presence of this play (See Diag.6:"Tube holder play adjustment ", page 5).



Diag.6:Tube holder play adjustment

If necessary adjust tube holder’s locker to get a correct play (See Diag.7:“Tube holder locker ”, page 5).



Diag.7:Tube holder locker

⚠ Without this play, because of the tube’s cap, the tube holder may not open correctly.

Tight the locker screws when adjustment is correct.

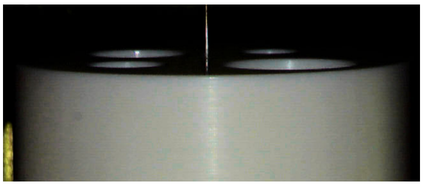
4. Needle adjustment

When the adjustment of the tube holder is completed, adjust the **Tube Holder Position** to get a correct needle sampling position.

From menu: **Services\Technician menu\Gains\MDSS Adjustment\Holder Adjustment**, press

Adjustment button.

Turn the tube holder to a halfway position and close the tube holder.



Diag.8:Tube holder in halfway position

The needle goes down until it touch the top of the tube holder, the number of step from the needle home position to the top of the tube holder is returned into the **Tube Holder Position** field of the window.

Press **Accept Value** button to validate and save the new adjustment.

5. Adjustment check

Once all adjustments have been carried out check all the screws hadve been well tighten.

Run few samples in stat mode to check that tube holder operates correctly.

6. Compatible tube list

Legend:
- **MAN**: Manufacturer
- **BC**: Barcode

Tube holder position:
- **GBL0183** Standard tube holder: Position 1, position 2, position 3, position 4
- **GBL0254** optional tube holder: Position 1, position 3, position 5, position 6

Table 1: Tube holder Position 1

Manufacturer	Model	Part number	Additive	Vol.	Vacuum	Stickers	Piercing Conditions	Type of cap	Observations
Becton D	Vacutainer	368452	K3-EDTA	5ml		MAN+BC	With cap	Rubber with groove	
Becton D	Vacutainer	367651	K3-EDTA	5ml	2ml	MAN+BC	With cap	Hemogard	
Becton D	Vacutainer	367856	K3-EDTA	5ml	3ml	MAN+BC	With cap	Hemogard	
Becton D	Vacutainer	367652	K3-EDTA	5ml	3ml	MAN+BC	With cap	Hemogard	
Becton D	Vacutainer	367654	K3-EDTA	5ml	4.5ml	MAN+BC	With cap	Hemogard	
Terumo	Venoject II	VP-053SDK	K3-EDTA	5ml	3ml	MAN	With cap	Ultraseal	
Terumo	Venoject	VT-050STK	K3-EDTA	5ml	5ml	MAN	With cap	Rubber with groove	
Terumo	Venoject	VT-053STK	K3-EDTA	5ml	3ml	MAN	With cap	Rubber with groove	
CML	ABX 3004002	TH5C0C	K3-EDTA	5ml	4ml	MAN+BC	With cap	Rubber strongly not advisable	
Greiner	Vacuette	454087	K3-EDTA	5ml	2ml	MAN+BC	With cap	Hemogard	
Greiner	Vacuette	454086	K3-EDTA	5ml	3ml	MAN+BC	With cap	Hemogard	
Greiner	Vacuette	454036	K3-EDTA	5ml	4ml	MAN+BC	With cap	Hemogard	
Greiner	Vacuette	454223	K3-EDTA	5ml	4,5ml	MAN+BC	With cap	Hemogard	
LDM Paris			EDTAKE	5ml	4,5ml	MAN+BC	With cap	Hemogard	

Table 2: Tube holder Position 2

Manufacturer	Model	Part number	Additive	Vol.	Vacuum	Stickers	Piercing Conditions	Type of cap	Observations
Becton D	Vacutainer	6385	K3-EDTA	5ml		MAN	*Without cap	Rubber strongly not advisable	*Because of the cap thickness and the lack of space between the holder and the top of the tube holder may not open correctly.
Terumo	Venoject	VT-030STK	K3-EDTA	3ml	3ml	MAN	With cap	Rubber strongly not advisable	

Table 3: Tube holder Position 3

Manufacturer	Model	Part number	Additive	Vol.	Vacuum	Stickers	Piercing Conditions	Type of cap	Observations
Comar	R&D system	TX2B 18533IF		5ml	2,2ml		Without cap	with thread	

Table 4: Tube holder Position 4

Manufacturer	Model	Part number	Additive	Vol.	Vacuum	Stickers	Piercing Conditions	Type of cap	Observations
Sarstedt		901091		0,5ml		*Out of format	Without cap	Unlostable	*The tube accepts a small sticker (not supplied by the manufacturer)
Kabe	ABX3001001	0777008RED		0,5ml		*Out of format	Without cap	Unlostable	*The tube accepts a small sticker (not supplied by the manufacturer)

Table 5: Tube holder Position 5

Manufacturer	Model	Part number	Additive	Vol.	Vacuum	Stickers	Piercing Conditions	Type of cap	Observations
Becton D	Microtainer	365975		0,5ml		*Out of format	Without cap	**Microgard	*The tube accepts a small sticker (not supplied by the manufacturer) **Cap fitted with an adaptator (require another probe adjustment)

Table 6: Tube holder Position 6

Manufacturer	Model	Part number	Additive	Vol.	Vacuum	Stickers	Piercing Conditions	Type of cap	Observations
Becton D	Microtainer	365973		0,5ml		*Out of format	Without cap		*The tube accepts a small sticker (not supplied by the manufacturer)

Power supply replacement Procedure

RAS339AA

- Concerns

  Instrument dismantling : Power supply

- Required tools

  - Hexagonal keys
  - Flat screw driver

- Required products

  None

- Intervention time

  30 min

- Frequency

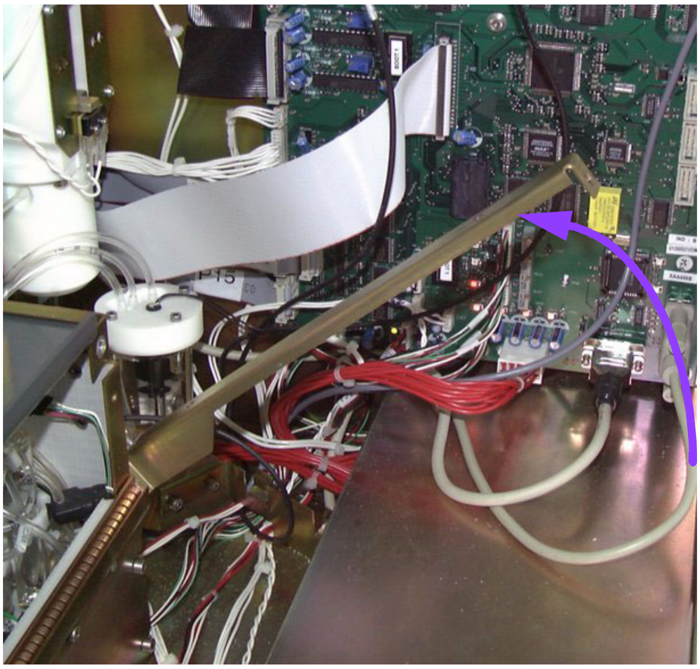
  On request

- Specific kit or consumables

  Power supply : DBN006A

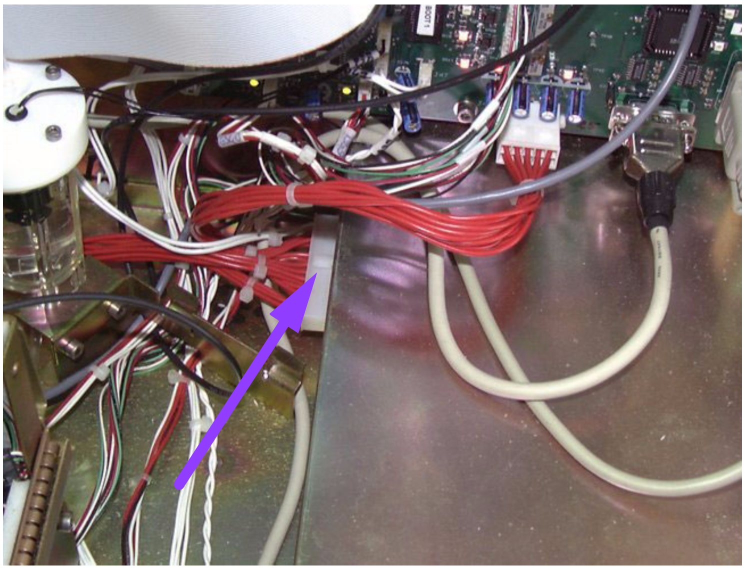
⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Switch off the instrument.
Disconnect Power supply cable.
Remove cover (See RAS342).
Lift the bar up by unscrewing the right screw (See Diag.1 “Bar screw”, page 2).



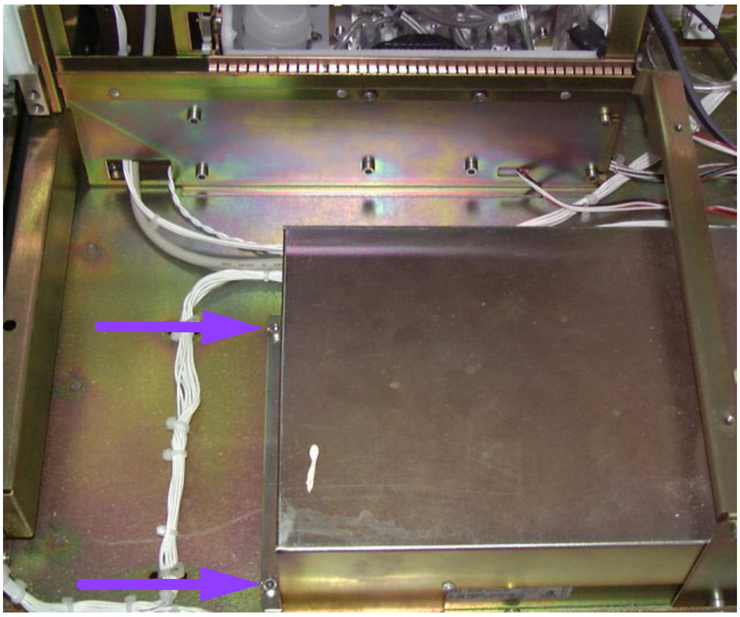
Diag.1 Bar screw

Disconnect, on the Power supply, the **supply connector** (See Diag.2 “Power supply connector”, page 2).



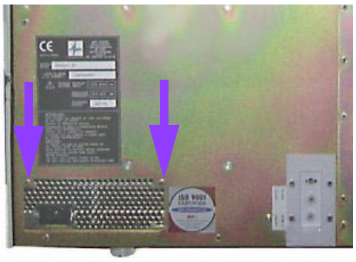
Diag.2 Power supply connector

Unscrew the 2 front screws of the Power supply (See Diag.3 “Power supply front screws”, page 3).



Diag.3 Power supply front screws

Unscrew the 2 back screws of the Power supply (See Diag.4 “Power supply back screws”, page 3).

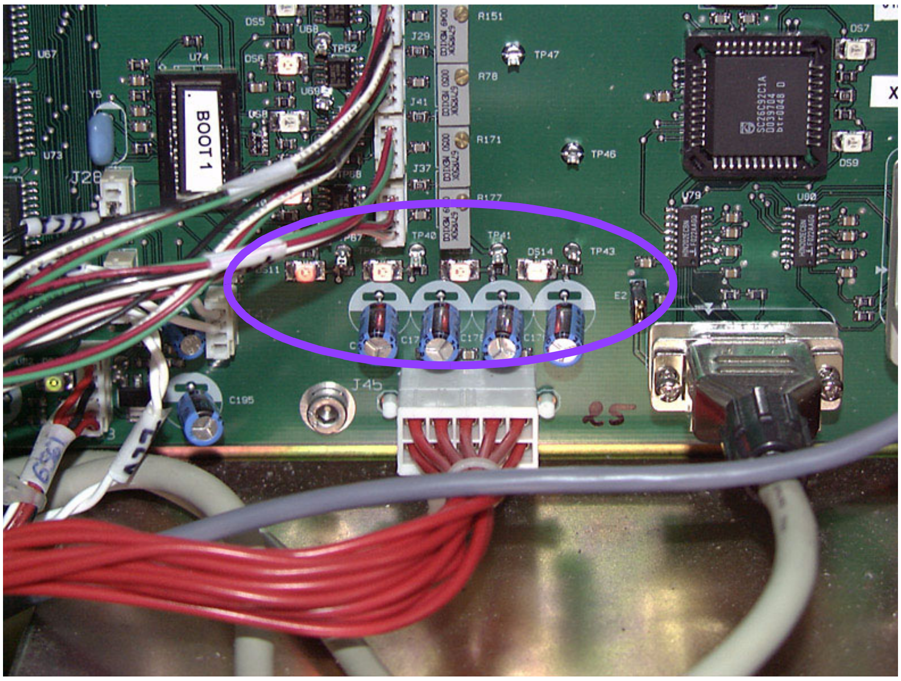


Diag.4 Power supply back screws

Remove the Power supply.
Reassemble following previous steps backward.
Switch on the instrument.
Check following voltages on mother board (See Table 1: “Power supply voltages”, page 3 and See Diag.5 “Test points”, page 4).

Table 1: Power supply voltages

Test point	Designation	Target
TP40	+5V Power supply	+5V
TP41	+15V Power supply	+15V
TP42	+24V Power supply	+24V
TP43	-15V Power supply	-15V



Diag.5 Test points

Check up after intervention Procedure

RAS340AA

- Concerns

  Check up and control of the instrument accuracy:
  - Repeatability
  - Calibration
  - Control

- Required tools

  None

- Required products

  - Fresh and normal blood samples
  - Calibration blood samples
  - Control blood

- Intervention time

  45min.

- Frequency

  On request

- Specific kit or consumables

  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Repeatability

This procedure must be performed on a clean instrument.
If the instrument is suspected to not be perfectly clean, perform a Concentrated cleaning.

The measurement of repeatability is based on the set of 10 results obtained from the consecutive analyses of the same blood sample.

CBC or DIF type analyses can be invoked (combination is not supported) with a limit of 35 results per test. Beyond the 35th result, data generated from new analysis will be disregarded.

To remain undisturbed the CV calculation, the potential results containing defaults generated directly from the analyses channels are rejected. In that case, a dialog box informs the user.

From **Quality Assurance Menu** menu enter **Within run** menu and run several samples in DIF mode. Check that obtained coefficients of variation are within the following limits.

Table 1: Within Run Coefficients of variation

Parameter	%CV	Test Level
WBC	<2%	at 10x10³/µl
RBC	<2%	at 5x10⁶/µl
Hgb	<1%	at 15g/dl
Hct	<1%	at 45%
Plt	<5%	at 300x10³/µl

2. Calibration

Calibration function is used to determine the values of the calibration coefficients to calibrate the instrument with known result samples.

From **Quality Assurance Menu** press the **Calibration** button.

Select the calibrator lot number you are going to use for calibration in the left area of the window.

If the calibrator is not listed create it.

From the **Calibration Target** menu check target values are correct, if not press **Edit** button, beep your current calibrator barcode (or type in the target values supplied with calibrator leaflet in the reserved fields), then confirm by pressing **Ok** button. Exit the **Target Values** by pressing **Return** button.

Prepare the calibrator according to the specific instructions detailed in the calibrator package insert (temperature, mixing...).

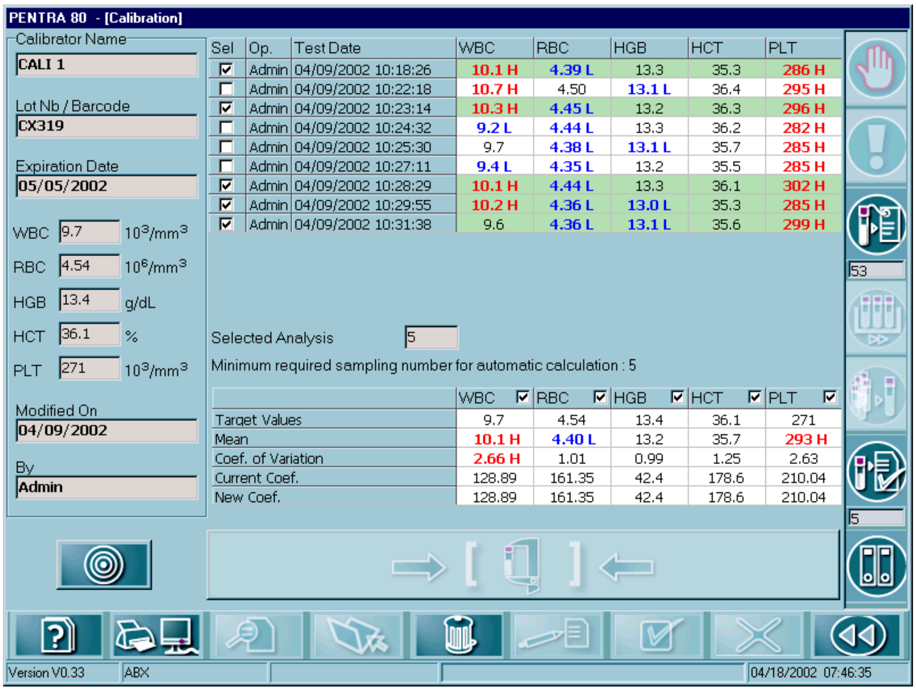
Press the **Stat** mode button, open the calibrator vial and install it the tube holder.

Close the door.

When the tube holder opens, remove and recap the vial.

Risk of erroneous results if the calibrator is not continously mixed between each analysis.
In order to obtain a correct calibration it is recommended to run at least 5 calibrator samplings.

When the analysis cycle ends, the result is displayed on the result grid. Run the calibrator 4 more times.



Calibrator Name: CALI 1

Lot Nb / Barcode: CX319

Expiration Date: 05/05/2002

WBC 9.7 $10^3/mm^3$

RBC 4.54 $10^6/mm^3$

HGB 13.4 g/dL

HCT 36.1 %

PLT 271 $10^3/mm^3$

Modified On: 04/09/2002

By: Admin

Sel	Op.	Test Date	WBC	RBC	HGB	HCT	PLT
☑	Admin	04/09/2002 10:18:26	10.1 H	4.39 L	13.3	35.3	286 H
☐	Admin	04/09/2002 10:22:18	10.7 H	4.50	13.1 L	36.4	295 H
☑	Admin	04/09/2002 10:23:14	10.3 H	4.45 L	13.2	36.3	296 H
☐	Admin	04/09/2002 10:24:32	9.2 L	4.44 L	13.3	36.2	282 H
☐	Admin	04/09/2002 10:25:30	9.7	4.38 L	13.1 L	35.7	285 H
☐	Admin	04/09/2002 10:27:11	9.4 L	4.35 L	13.2	35.5	285 H
☑	Admin	04/09/2002 10:28:29	10.1 H	4.44 L	13.3	36.1	302 H
☑	Admin	04/09/2002 10:29:55	10.2 H	4.36 L	13.0 L	35.3	285 H
☑	Admin	04/09/2002 10:31:38	9.6	4.36 L	13.1 L	35.6	299 H

Selected Analysis: 5

Minimum required sampling number for automatic calculation : 5

	WBC ☑	RBC ☑	HGB ☑	HCT ☑	PLT ☑
Target Values	9.7	4.54	13.4	36.1	271
Mean	10.1 H	4.40 L	13.2	35.7	293 H
Coef. of Variation	2.66 H	1.01	0.99	1.25	2.63
Current Coef.	128.89	161.35	42.4	178.6	210.04
New Coef.	128.89	161.35	42.4	178.6	210.04

Diag.1:Calibration window

In the event that the result shows an analysis fault or reject, the result is not stored. An error message advising of rejection is diplayed.

To discard a result from the statistical calculation, click into the **Sel** column the checked box to remove the result from the statistical calculation.

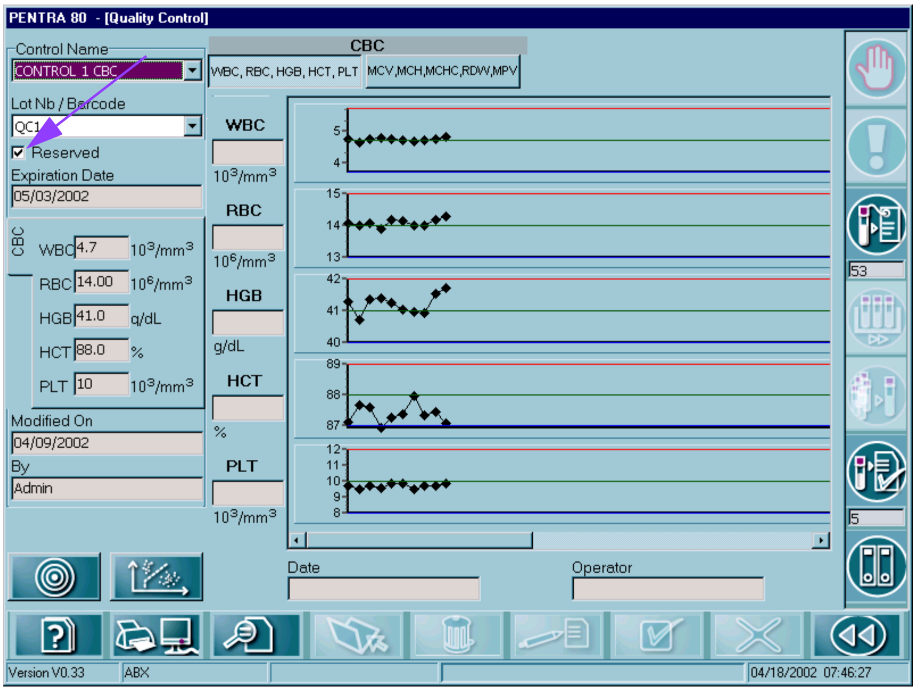
If the coefficient of variation is within the limits and the percentage difference between the target and the mean value is less than 20, instrument allows an automatic calibration. Press **Automatic calculation** button to calculate new coefficients then **Ok** button to confirm and apply new coefficients of calibration.

Sometimes you may have to use the forced calibration to enter new coefficients when instrument is very far from its normal range. A warning message shall request confirmation to continue, validate then perform a control of the instrument.

3. Control

Run several controls to check and validate the calibration. When using DIFFTROL control blood, use the floppy disk to update lot parameters.

Select the **Reserved** box to link the lot number to QC results for further analyses.


PENTRA 80 - [Quality Control]
CBC
WBC, RBC, HGB, HCT, PLT
MCV,MCH,MCHC,RDW,MPV
WBC
$10^3/mm^3$
RBC
$10^6/mm^3$
HGB
g/dL
HCT
%
PLT
$10^3/mm^3$
5
4
15
14
13
42
41
40
89
88
87
12
11
10
9
8
Date
Operator
53
5

Control Name: CONTROL 1 CBC

Lot Nb / Barcode: QC1

☑ Reserved

Expiration Date: 05/03/2002

CBC

WBC 4.7 $10^3/mm^3$

RBC 14.00 $10^6/mm^3$

HGB 41.0 g/dL

HCT 88.0 %

PLT 10 $10^3/mm^3$

Modified On: 04/09/2002

By: Admin

Version V0.33 | ABX | 04/18/2002 07:46:27

Diag.2:Control window

MDSS Technology pentra 80

Optical bench Dismantling & Replacement Procedure

RAS341AA

HORIBA DIAGNOSTICS

- Concerns

  Optical bench:
  - Dismantling
  - Replacement
  - Control

- Required tools

  - Hexagonal keys
  - Dynamometric screwdriver A302, A301, A300
  - Flat screwdriver
  - Torx keys

- Required products

  None

- Intervention time

  30min.

- Frequency

  On request

- Specific kit or consumables

  None

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

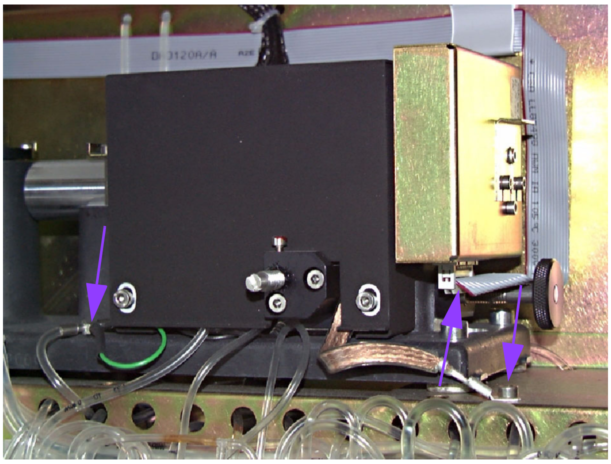
1. Optical bench dismantling

Switch the instrument off.

Disconnect power supply cable.

Remove the lefthand side vertical panel and the top cover to access to the optical bench.

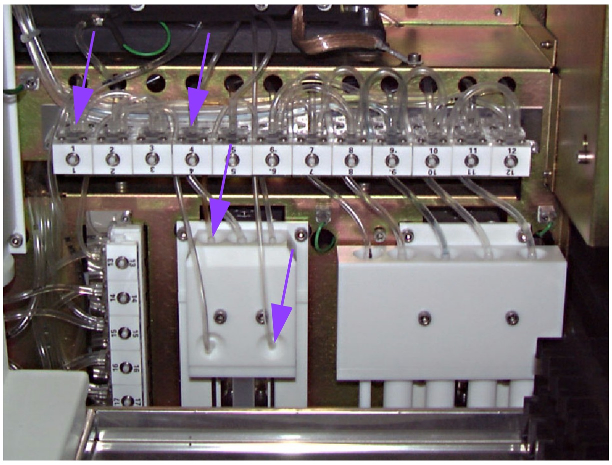
From the Optical bench disconnect the following cables (See Diag.1: "Optical bench dismantling (Ground, Ground fitting, Signal cable)", page 2):



Diag.1:Optical bench dismantling (Ground, Ground fitting, Signal cable)

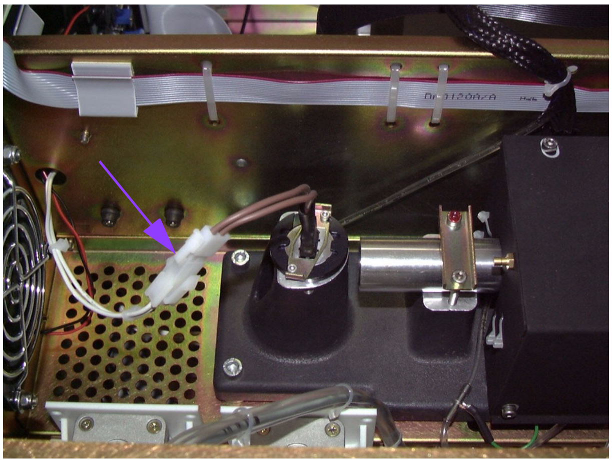
Disconnect tubes from LMNE syringe:
- Inlet 1
- Inlet 2

Disconnect tubes from valves:
- 1, Inlet 1
- 4, Inlet 2



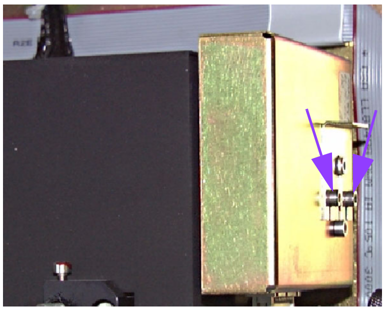
Diag.2:LMNE syringe and Valves disconnection

Disconnect the Optical bench lamp power supply connector (See Diag.3: "Optical bench lamp disconnection", page 3).



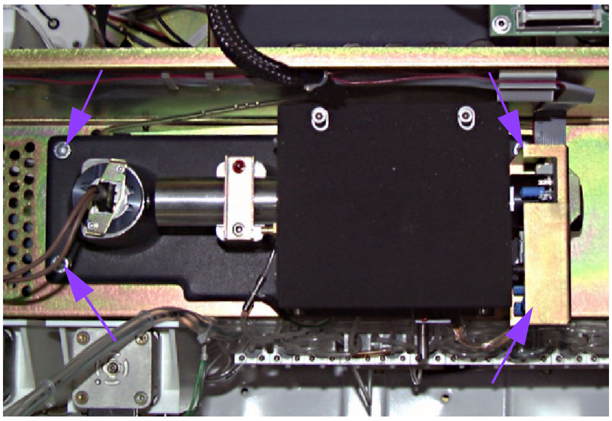
Diag.3:Optical bench lamp disconnection

Remove the Optical bench electronic board, unscrew the 2 screws maintaining the board (See Diag.4: "Optical bench electronic board dismantling", page 3):



Diag.4:Optical bench electronic board dismantling

Untight the 4 fixation screws (silent-blocks) of the Optical bench on the frame (See Diag.5: "Optical bench fixation screws", page 3. Optical Bench board should be removed on the picture).



Diag.5:Optical bench fixation screws

Locate the new Optical bench and tight the silent-blocks (about 4 turns).

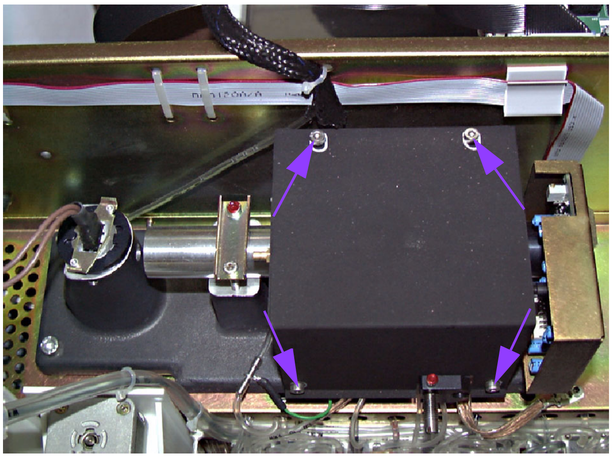
⚠ Do not tight too much the silent-blocks, check optical bench cannot be lifted.

Connect all the tubings and wirings previously disconnected in the reverse order.

2. Control of the Optical bench

2.1. Emission gun control of position

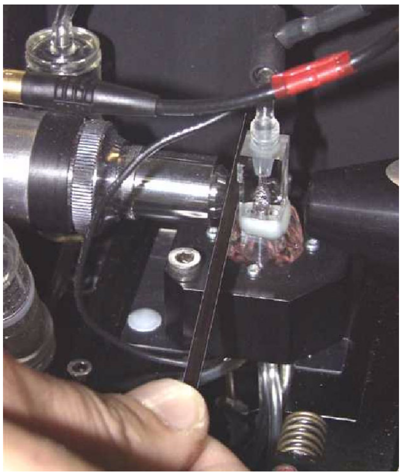
Remove the Optical bench cover (See Diag.6: “Optical bench cover dismantling”, page 4):



Diag.6:Optical bench cover dismantling

Check that gap between the emission gun and the flowcell is around 3mm. (See Diag.7: “Optical bench control”, page 4).

Be carefull not to damage the flowcell nor the emission gun with the allen key.

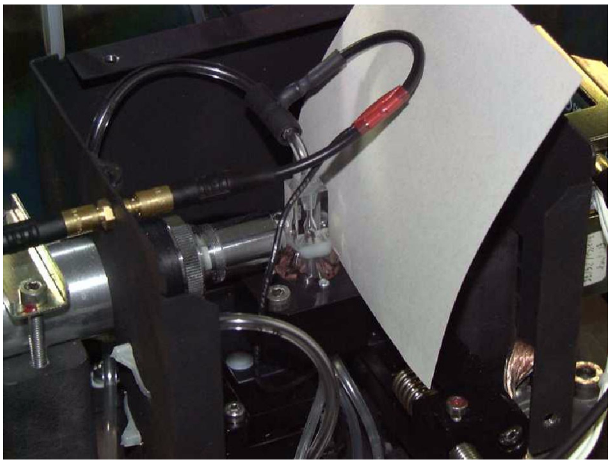


Diag.7:Optical bench control

This adjustment is factory made and must not be changed.

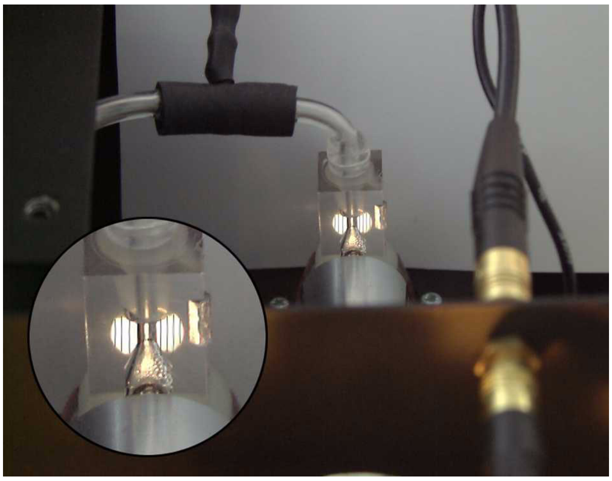
2.2. Optical bench lamp alignement control

Put a piece of white paper between reception gun and flowcell (See Diag.8: “Lamp control 1”, page 5).



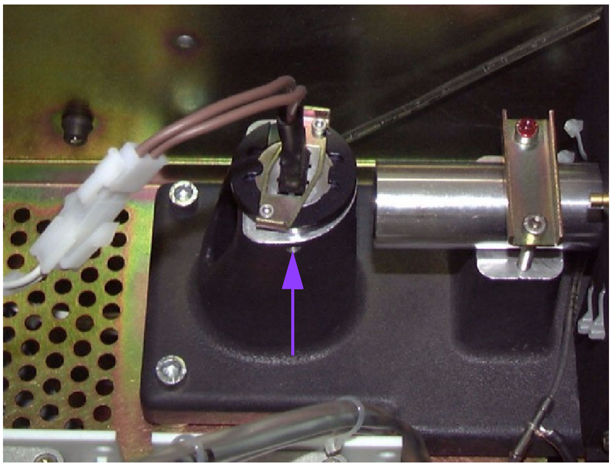
Diag.8:Lamp control 1

Check that the projection of lamp filament is vertical on the piece of paper (See Diag.9: “Lamp control 2”, page 5).



Diag.9:Lamp control 2

A small screw (1.2mm. allen key allows adjustment of the lamp position (See Diag.10: “Lamp adjustment screw”, page 5).



Diag.10:Lamp adjustment screw

⚠ This adjustment is factory made and must not be changed.

MDSS Technology pentra 80

Front panel & covers dismantling Procedure

RAS342AA

HORIBA DIAGNOSTICS

- Concerns

  Front panel & covers dismantling

- Required tools

  - Hexagonal keys
  - Flat screw driver

- Required products

  None

- Intervention time

  30min

- Frequency

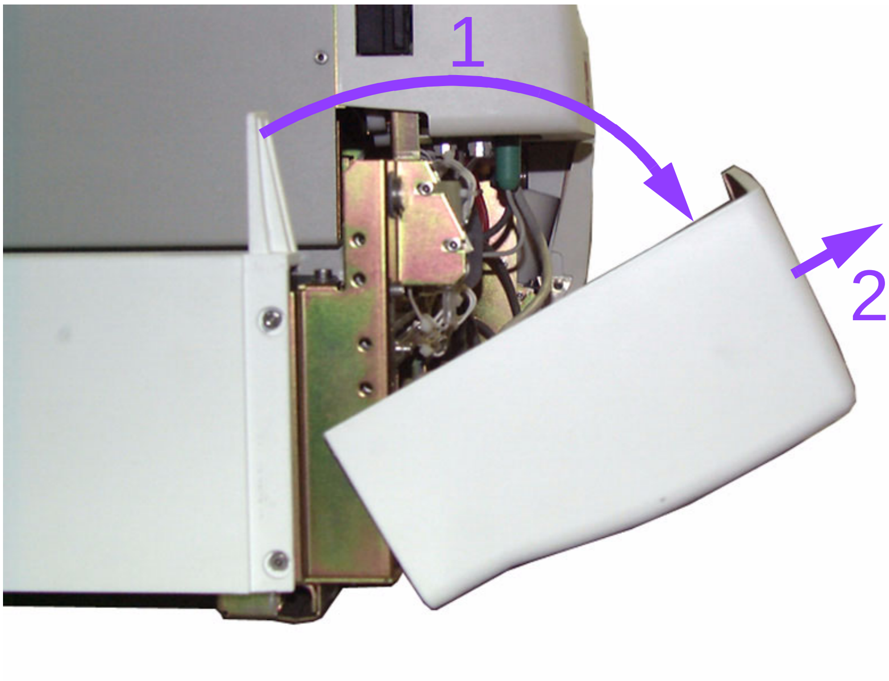
  On request

- Specific kit or consumables

  None

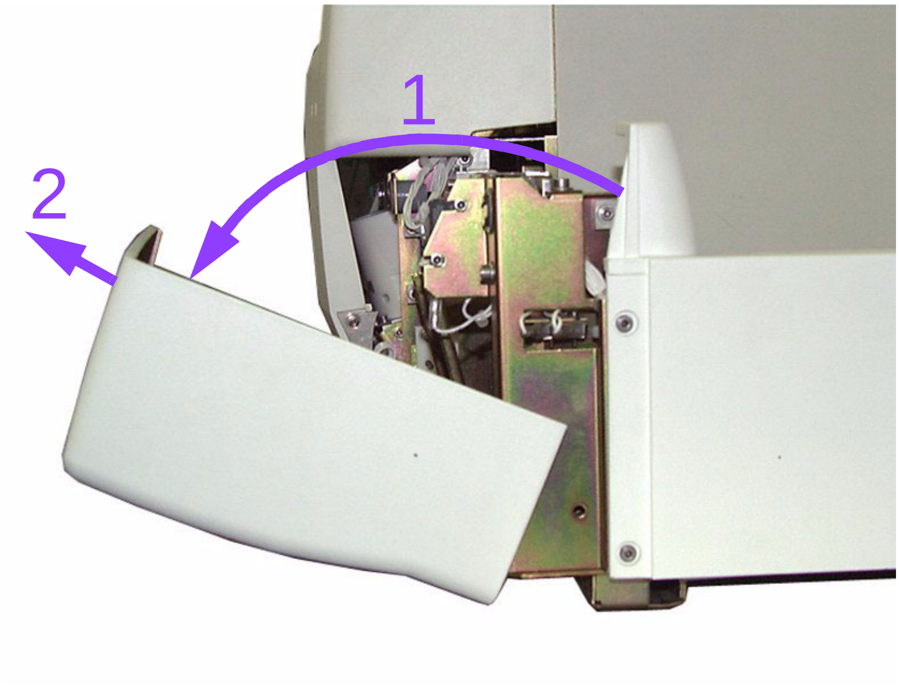
⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Switch off the instrument.
Disconnect power supply cable.
Pull **Front left cover** down (1), then remove it (2). (See Diag.1 “Front left cover”, page 2).



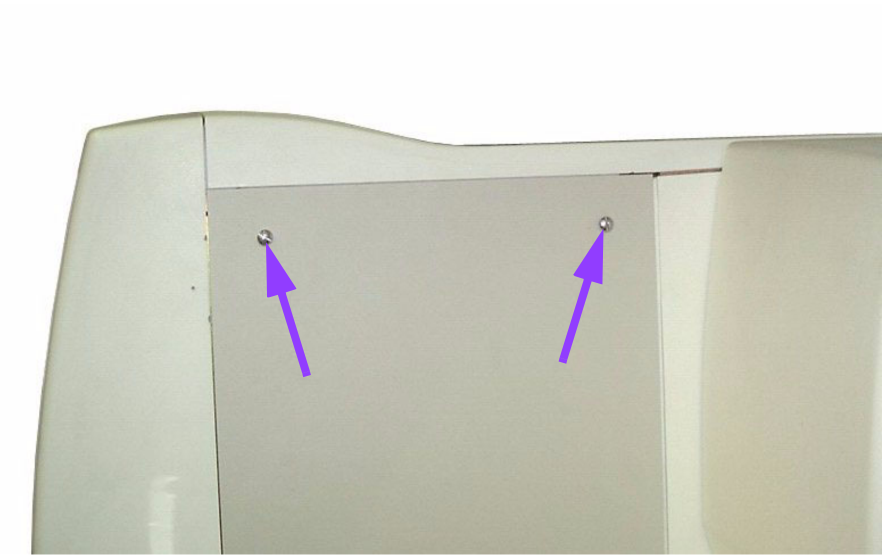
Diag.1 Front left cover

Pull **Front right cover** down (1), then remove it (2). (See Diag.2 “Front right cover”, page 2).



Diag.2 Front right cover

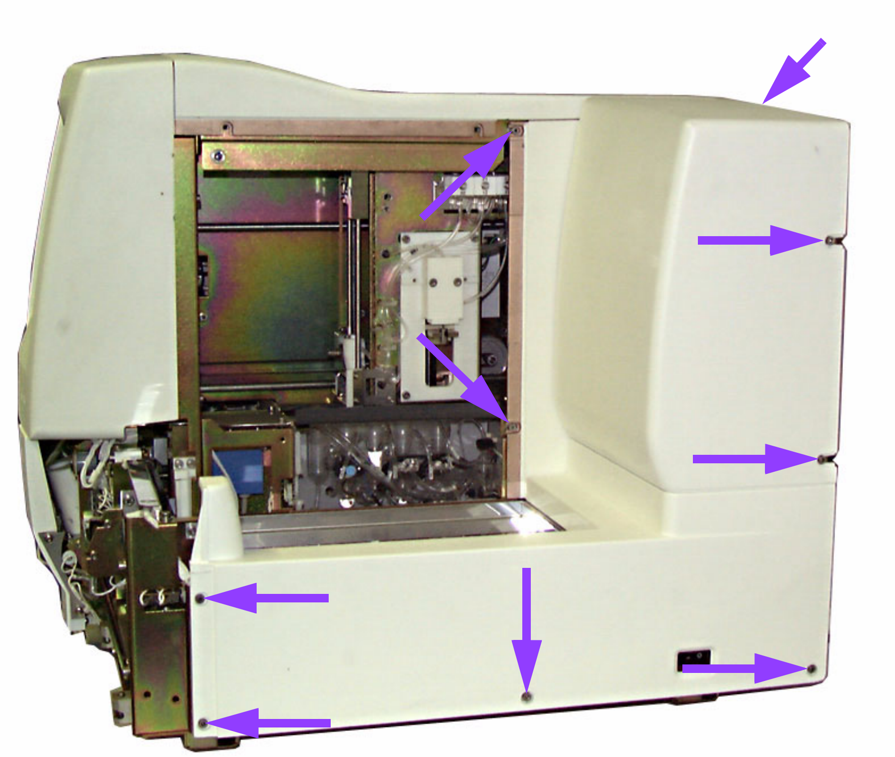
Open the **Right door**, place the key inside the screw slot and turn the captive screw counterclockwise (See Diag.3 “Right door”, page 3).



Diag.3 Right door

Remove **Right side cover** by unscrewing the 9 CHC M4X8 (See Diag.4 “Right side cover”, page 3).

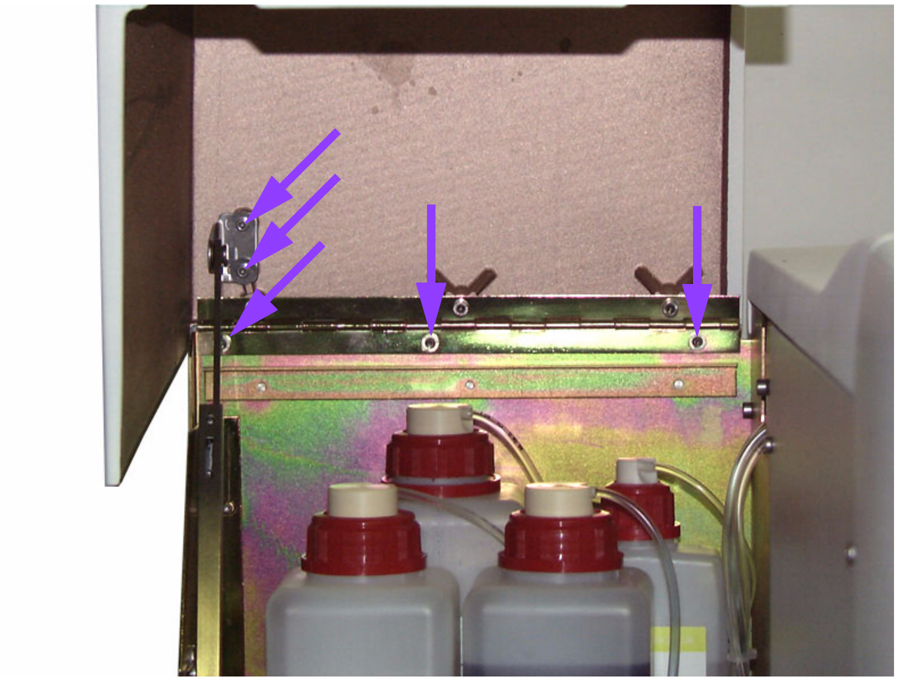
One of the screws is at the rear of the instrument, with a washer.



Diag.4 Right side cover

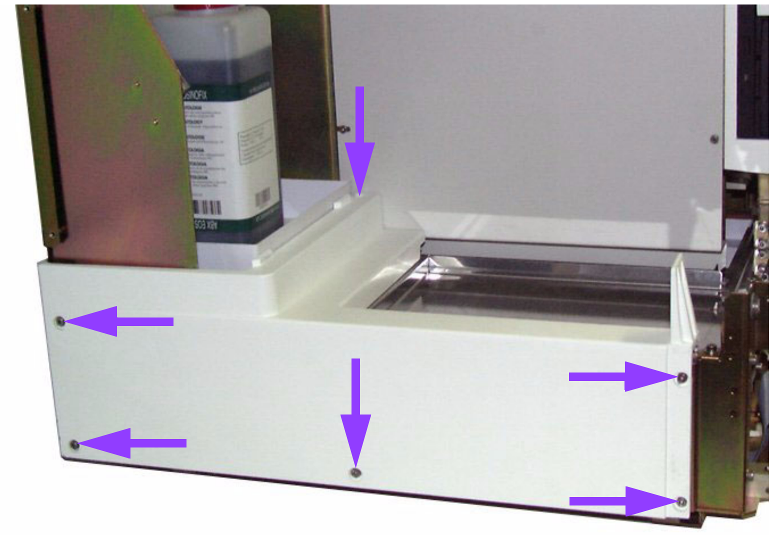
Open **Reagent cover** (lift up, then pull it slowly down).

Remove it with **Reagent cover hinge** by unscrewing 3 CHC M4X8 and 2 CHC M3X6 with washers (See Diag.5 “Reagent cover”, page 4).



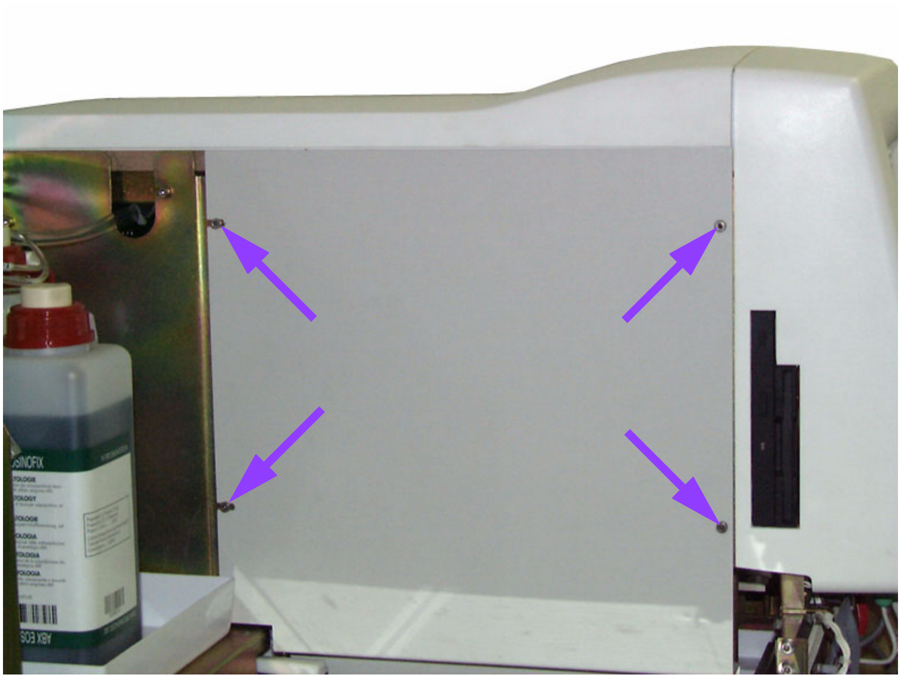
Diag.5 Reagent cover

Remove **Left side cover** by unscrewing 6 CHC M4X6 (See Diag.6 “Left side cover”, page 4).



Diag.6 Left side cover

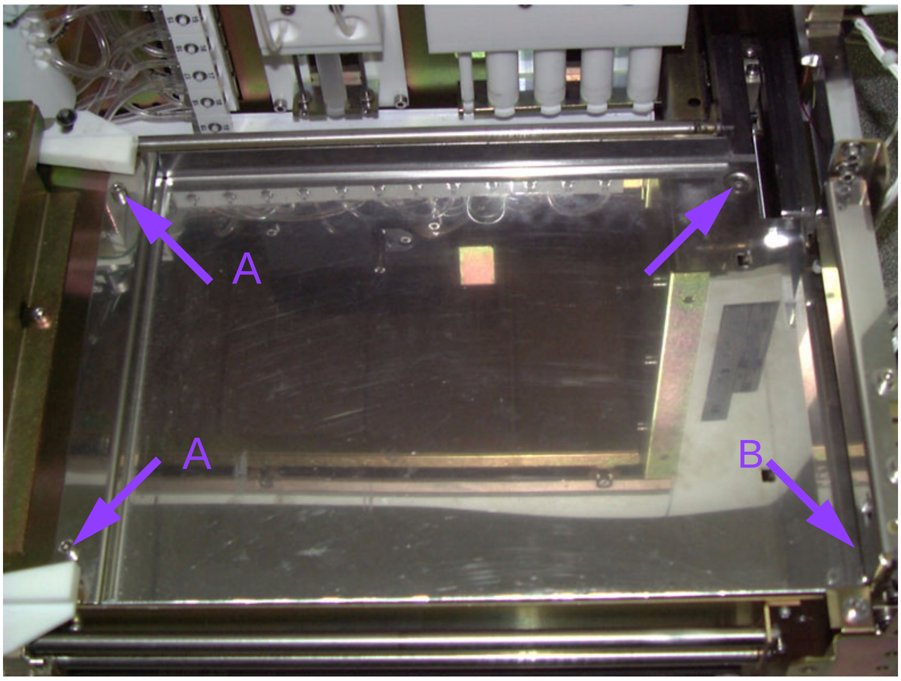
Remove **Left Panel** by unscrewing 2 CHC M4X6 at the front and loosening 2 CHC M4X6 at the rear (See Diag.7 “Left panel”, page 5).



Diag.7 Left panel

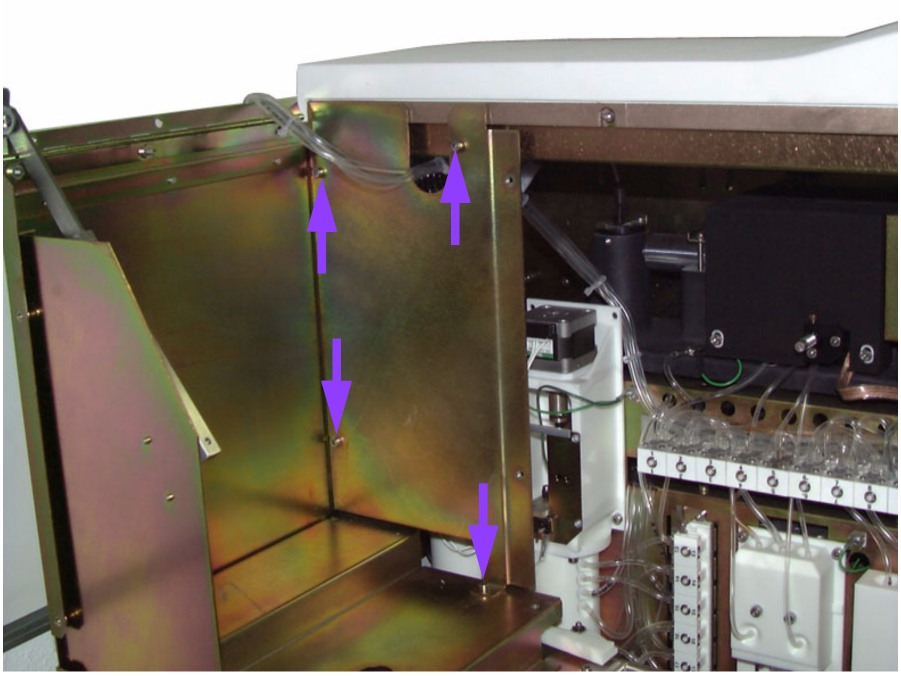
Remove **Loading tray** by unscrewing the 2 CHC M4X6 (A) and 1 FHC M4X6 and loosening 1 CHC M4X6 (B). (See Diag.8 “Loading tray”, page 5).

To remove loading tray, open the 2 **Slides,** then lift the tray from the rear to the front. Take care not to damage the switchs.



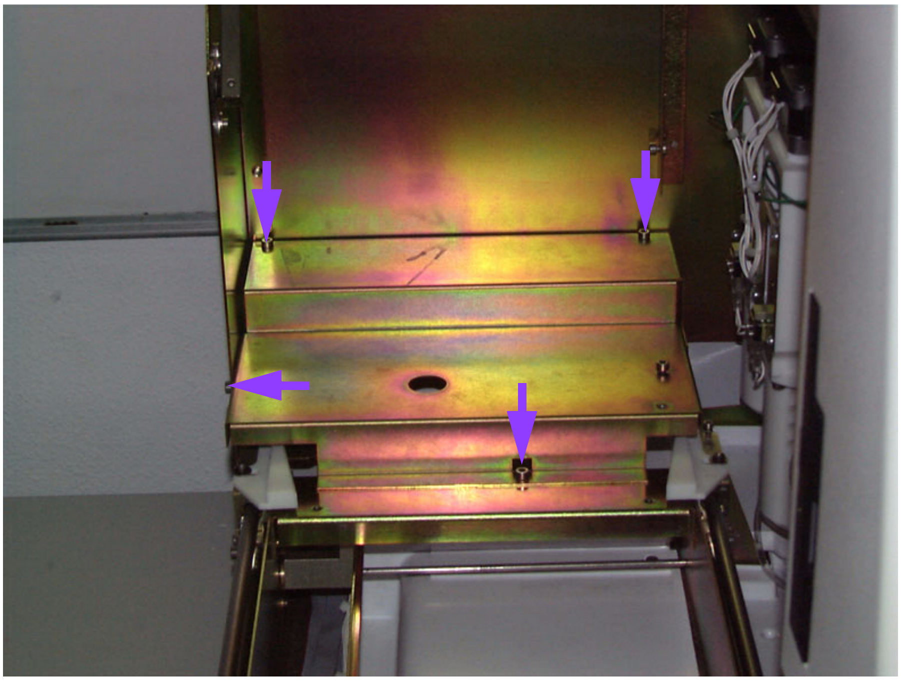
Diag.8 Loading tray

Remove the 4 reagent bottles (disconnect tubes from the stoppers).
Remove **bottle recuperation tray.**
Remove the **Rear panel** by loosening 4 CHC M4X6 (See Diag.9 “Rear panel”, page 6).



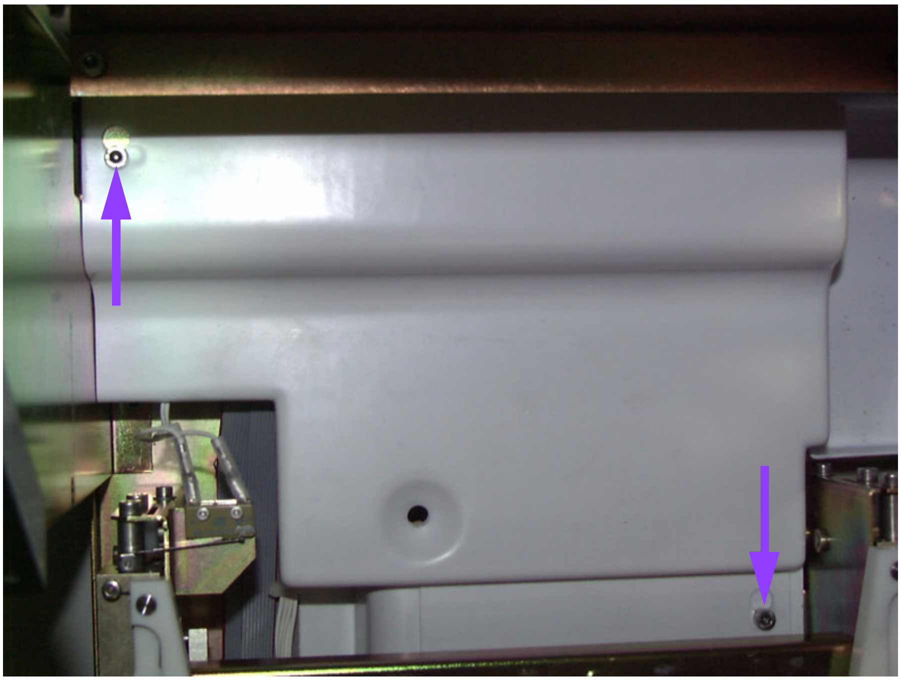
Diag.9 Rear panel

Remove **Bottle support** by loosening 4 CHC M4X6 (See Diag.10 “Bottle support”, page 6).



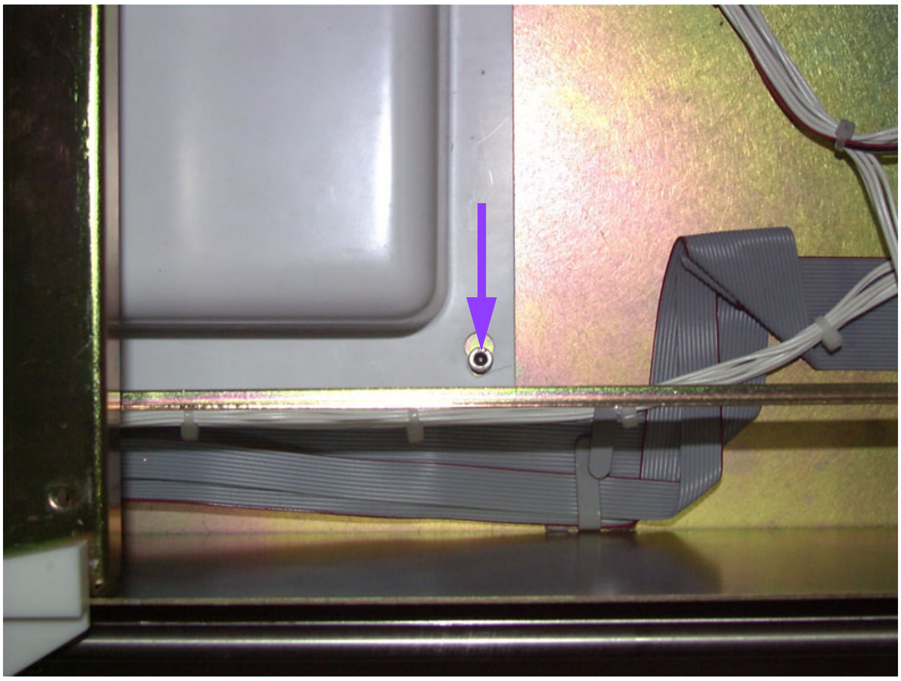
Diag.10 Bottle support

Remove the **Motor board protection 1** by loosening the 2 CHC M4X6 screws (See Diag.11 “Motor board protection 1”, page 7).



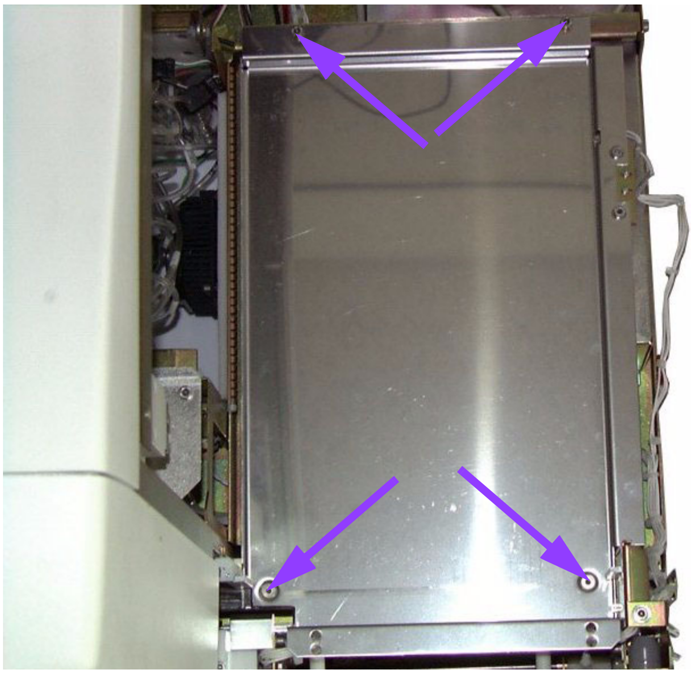
Diag.11 Motor board protection 1

Remove the **Motor board protection 2** by loosening the CHC M4X6 screws (See Diag.12 “Motor board protection 2”, page 7).



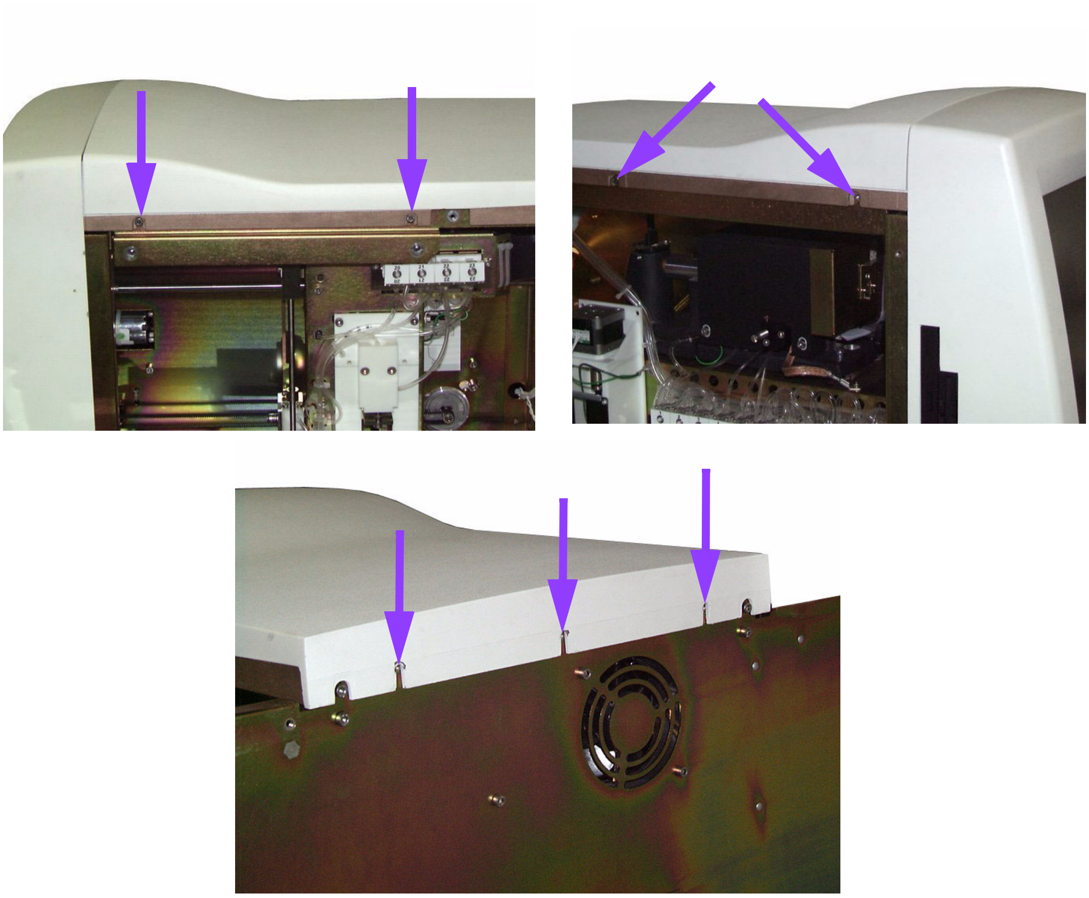
Diag.12 Motor board protection 2

Remove **Ejection Tray** by unscrewing 2 CHC M4X6 and 2 FHC M4X6 (See Diag.13 "Ejection tray", page 8).



Diag.13 Ejection tray

Remove **Upper Cover** by unscrewing 6 CHC M4X6 screws : 2 on the right side, 2 on the left side and 3 at the rear of the instrument (See Diag.14 "Upper cover", page 8).



Diag.14 Upper cover

Internal barcode adjustment Procedure

RAS343AA

- Concerns

  Adjustment of the internal barcode reader.

- Required tools

  - Allen keys
  - Flat screwdriver

- Required products

  None

- Intervention time

  15 min.

- Frequency

  On request

- Specific kit or consumables

  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Barcode reader adjustment check

Remove cover (see RAS342 procedure).

Load a rack with 2 tubes fitted with the same large barcode sticker in position 1 and 2, to check the correct barcode reading operation.

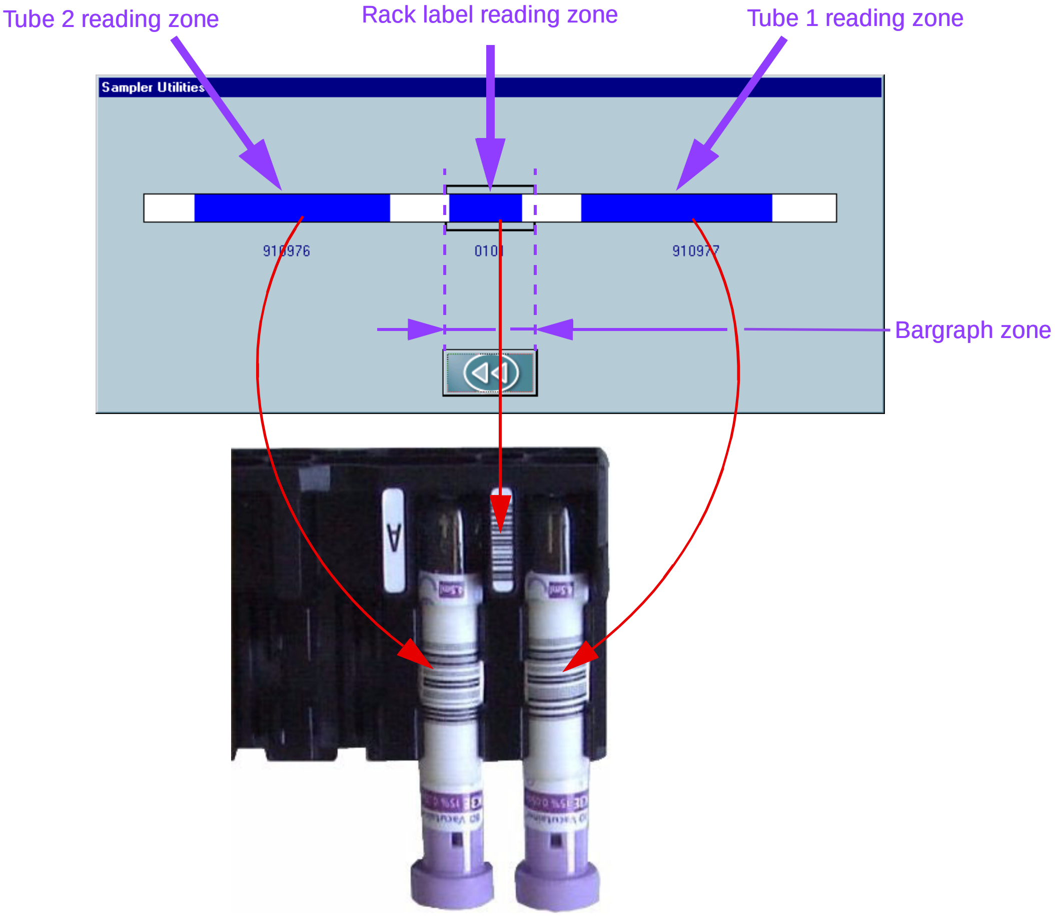
Enter: **Menu\Service\Technician Menu\Gains\Sampler Adjustment.**

Put the rack on Loading Tray.

Press **Barcode Reader Adjustment** button.

Rack is moving in front of Barcode Reader and cycle starts.

At the end of cycle, Rack label reading zone must be within bargraph zone (See Diag.1:“Barcode screen”, page 2).


Tube 2 reading zone
Rack label reading zone
Tube 1 reading zone
Sampler Utilities
910976
0101
910977
Bargraph zone

Diag.1: Barcode screen

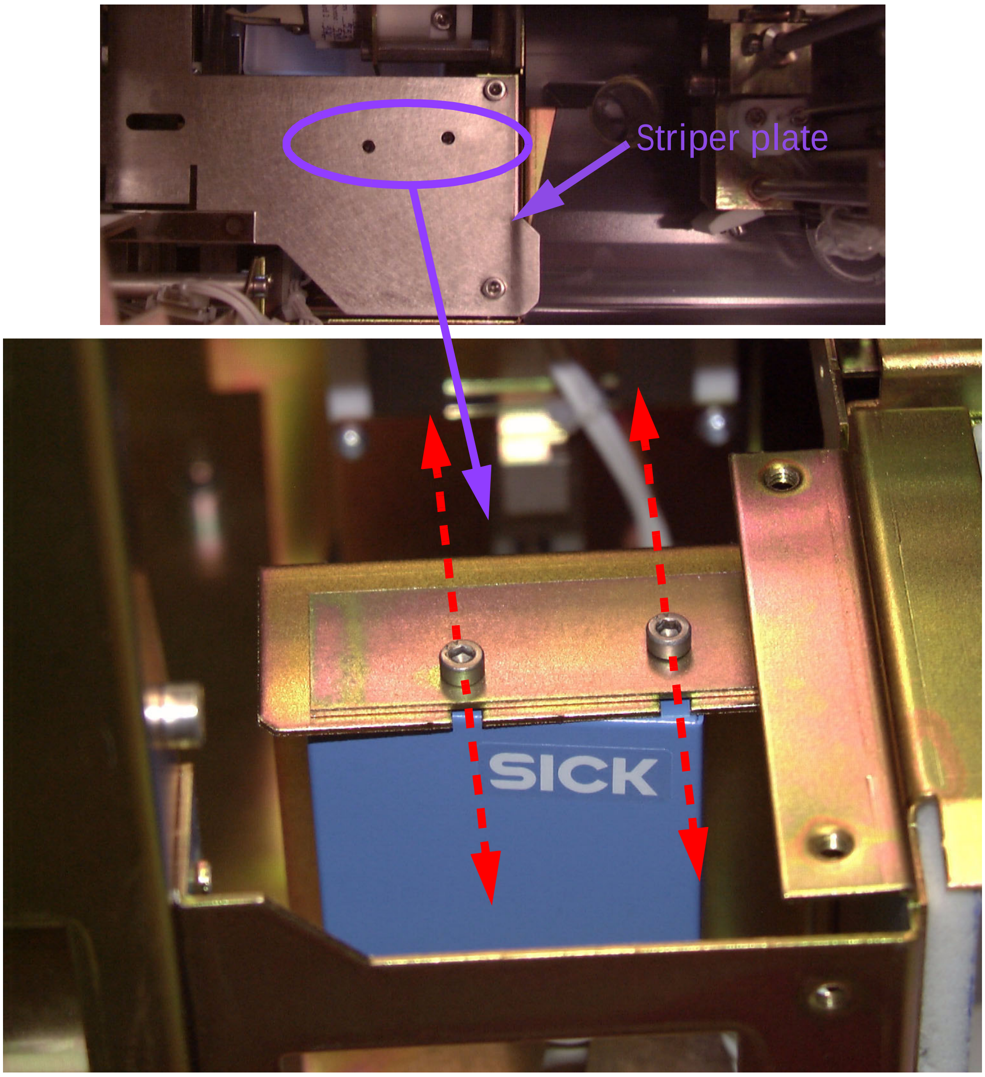
Tube reading zone depens on label width and label condition. If there is reflections, reading zone may be in several parts.

2. Barcode reader adjustment

If Rack label reading zone is not within bargraph zone, free the Barcode Reader Support Plate by loosening the two M3x6 CHC screws (See Diag.2:“Barcode reader”, page 3), then move it to adjust reading position.

To reach the screws, there are two holes in Stripper Plate (See Diag.2:“Barcode reader”, page 3).
The angle between the Barcode Reader and the label to read must be always the same.
Barcode Reader Support Plate purpose is only to move to the Left or to the Right.

When you are in front of the system:
If Rack Label Reading Zone is on the right , **pull** barcode reader on the EjectionTray side.
If Rack Label Reading Zone is on the left , **push** barcode reader on the LoadingTray side.
Press **Barcode Reader Adjustment** button and check Rack Label Reading Zone position.
Repeat this procedure until you get the correct adjustment.



Diag.2: Barcode reader

External barcode configuration Procedure

RAS344AA

HORIBA DIAGNOSTICS

- Concerns

  External barcode reader test and configuration.

- Required tools

  None

- Required products

  None

- Intervention time

  15 min.

- Frequency

  On request

- Specific kit or consumables

  None

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Barcode reader configuration check

Check that barcode reader is working properly by means of reading test.

INTERLEAVED 2 OF 5 (no «check digit» control)

with C.D.

1224488
reading1224488**1**

without C.D.

121314151617
reading 121314151617

CODE 39 (no «check digit» control)

with C.D.

reading 12345ABCDE

without C.D.

reading 12345ABCDEW

CODE 128 (control without «check digit» transmission)

123456abcde

QWERTY

12345ABCDE

azerty

CODABAR (no egality control between start/stop character)

37859
reading 37859

123456/$
reading 123456/$

Diag.1: Barcode reading test

2. Barcode reader setup

An audible beep occurs after each reading. Read all the labels from top to bottom and from left to right.

When the last label is read, check once more on the test labels.

⚠ For the code I2 of 5, to avoid a bad interpretation, it is mandatory to hold the reader in order to read the **entire** code.

If the reading test has failed for the DATALOGIC reader, proceed to the barcode setup as follows:

$+$* Restore system default configuration

$+ Enter configuration environment

CP507 WEDGE for IBM AT - ALT mode

AZ0 Disable all family code

AB11AB*0116 Code 39, no C.D., 1 to 16 char

AC110416 ITF, no C.D., 4 to 16 char

AD111AD*0316 Codabar, no start/stop, 3 to 16 char

AI11 Code128, C.D. control without transmission

EA10 no Terminator

ED3 *4* good reads before accepting code

$- Exit and save configuration

Diag.2: Barcode

MDSS Technology pentra 80

Heater assy replacement Procedure

RAS345AA

HORIBA
DIAGNOSTICS

Concerns

Replacement of the reagent heating system.

Required tools

- Hexagonal keys
- Flat screwdriver

Required products

None

Intervention time

1h.

Frequency

On request

Specific kit or consumables

XDA625AS

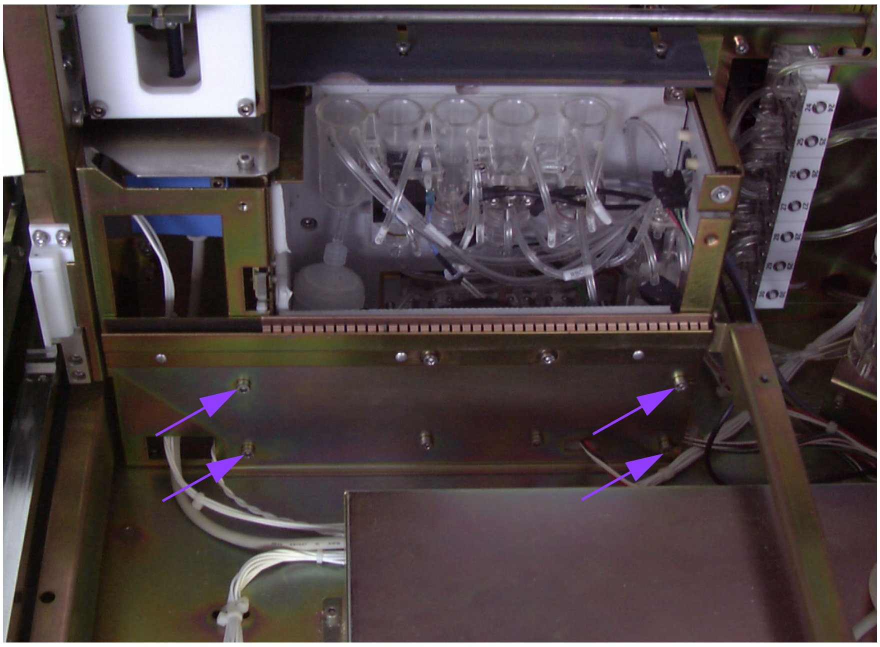
Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Heater assy dismantling

Switch the instrument off and disconnect power supply cable.

Remove the cover and open the rigthhand side panel (See procedure RAS342 Front panel & Cover dismantling for further details).

Remove the lower part of thermostatic room (See Diag.1:“Thermostatic room dismantling”, page 2).



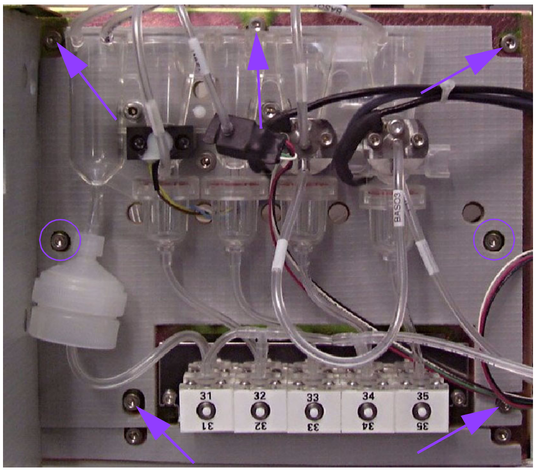
Diag.1:Thermostatic room dismantling

From the chamber assy disconnect the following tubes:

- Rinse chamber: Inlets 1&2
- Dil1\Hgb chamber: Inlet 2
- LMNE chamber: Inlet 4 (Leave the detection cell connected to the LMNE chamber)
- RBC chamber: Inlet 2
- WBC\Baso chamber: Inlets 1&4

Untight the 2 heater fixation screws (See Diag.2:“Chamber assembly dismantling”, page 2).

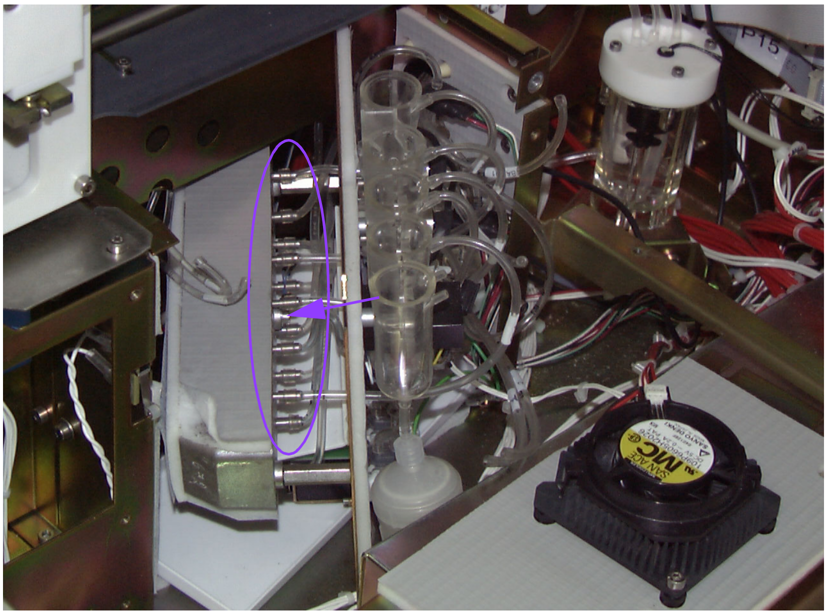
Unscrew the 5 chamber assembly fixation screws (See Diag.2:“Chamber assembly dismantling”, page 2).



Diag.2:Chamber assembly dismantling

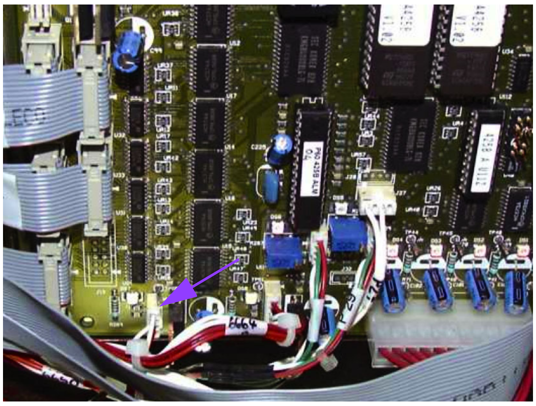
Unscrew the CTN fixation screw from the heater (See Diag.3:“Heater disconnection”, page 3).

After having recorded the tube location on the heater, disconnect all the tubes (See Diag.3:“Heater disconnection”, page 3).



Diag.3:Heater disconnection

Disconnect CTN from main board plug in J31 (See Diag.4:“CTN disconnection”, page 3).



Diag.4:CTN disconnection

Remove the heater.

2. Heater replacement

Install the new heater the same way in reverse order.

⚠ Use sleevings when necessary (Tubes connected to the heater for example).
Make sure all the tubes are connected.
Enter new CTN value and adjust Heating coil temperature after replacement.

When new heater is installed start the instrument and check for no leak.
Enter the **new CTN value** (Follow procedure RAS333 «Temperature adjustment»).
Check and adjust the MDSS adjustment (Follow procedure RAS329 «Chambers adjustment»).
Complete a rinse cycle then prime all reagents.
Perform the «Chekup after intervention» procedure RAS340 in order to be sure the instrument works properly.

Automatic sampler

RAS347AA

- Concerns
  - Loading mechanism check & adjustment
  - Mixer mechanism check & adjustment
  - Transfer mechanism check & adjustment

- Required tools

  None

- Required products

  None

- Intervention time

  1 h

- Frequency

  On request

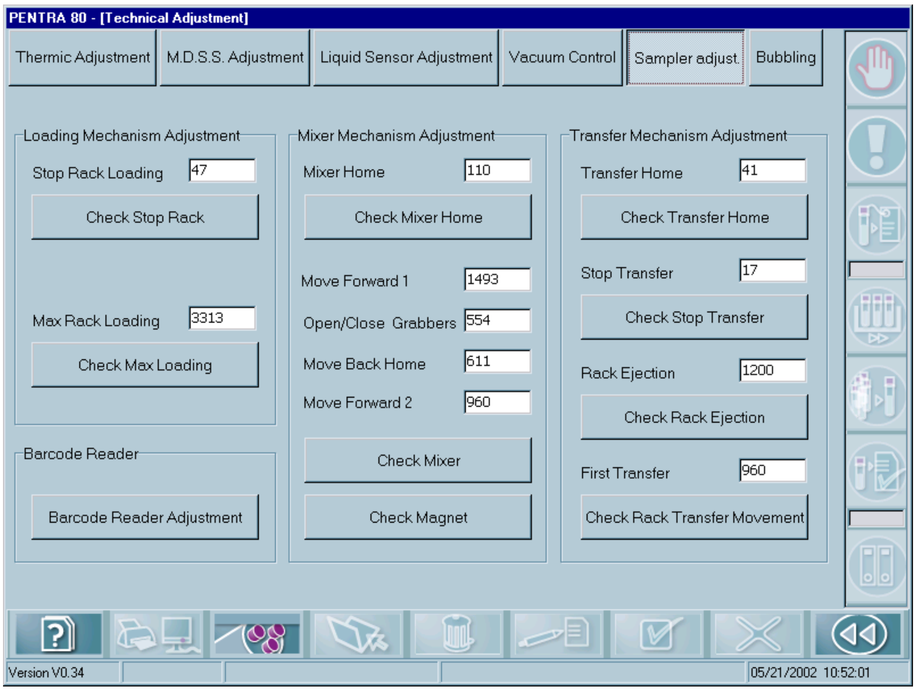
- Specific kit or consumables

  None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Loading mechanism check & adjustment

Remove cover except Loading Tray and Ejection Tray (See RAS342 procedure).
Enter: **Menu\Service\Technician Menu\Gains\Sampler Adjustment** (See Diag.1 “Sampler adjustment menu”, page 2)


PENTRA 80 - [Technical Adjustment]
Thermic Adjustment
M.D.S.S. Adjustment
Liquid Sensor Adjustment
Vacuum Control
Sampler adjust.
Bubbling
Loading Mechanism Adjustment
Check Stop Rack
Check Max Loading
Barcode Reader
Barcode Reader Adjustment
Mixer Mechanism Adjustment
Check Mixer Home
Check Mixer
Check Magnet
Transfer Mechanism Adjustment
Check Transfer Home
Check Stop Transfer
Check Rack Ejection
Check Rack Transfer Movement

Stop Rack Loading 47
Max Rack Loading 3313
Mixer Home 110
Move Forward 1 1493
Open/Close Grabbers 554
Move Back Home 611
Move Forward 2 960
Transfer Home 41
Stop Transfer 17
Rack Ejection 1200
First Transfer 960
Version V0.34
05/21/2002 10:52:01

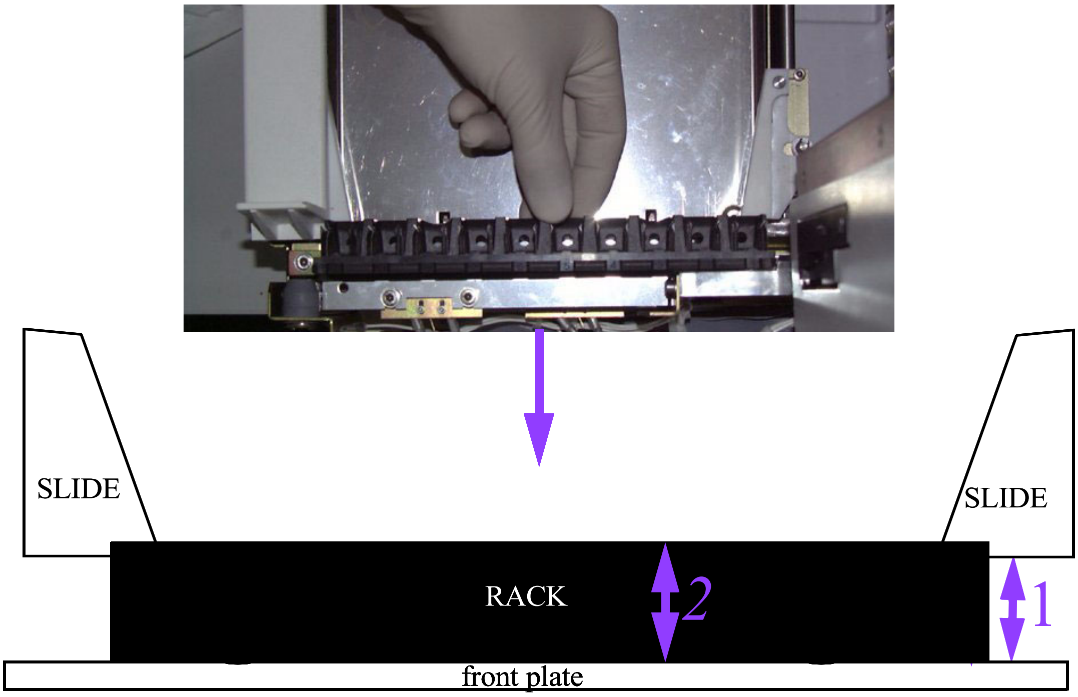
Diag.1 Sampler adjustment menu

Following adjustments must be checked and adjusted in the following order.
Make sure to not damage the different switches by moving manually the racks.

1.1. Max Rack Loading

«Max Rack Loading» value represents the **maximum** number of steps run by the Slides to load a rack. This motion must be superior to the necessary motion to load a rack, but without coming to mechanical stop (noise) if there is no rack (to ensure the correct position of the rack against the Front Plate).
This motion is never completed when there is a rack because it is stopped by the two switches.

Make sure there is no rack on the Loading Tray.
Press **Max Rack Loading** button (See Diag.1 “Sampler adjustment menu”, page 2).
When motion is ended,put a rack **on** the two Slides **against** the Front Plate**.**
The gap between the Slides and the Front Plate (1) must be smaller than the rack thickness (2). (See Diag.2 “Max rack loading gap”, page 3).



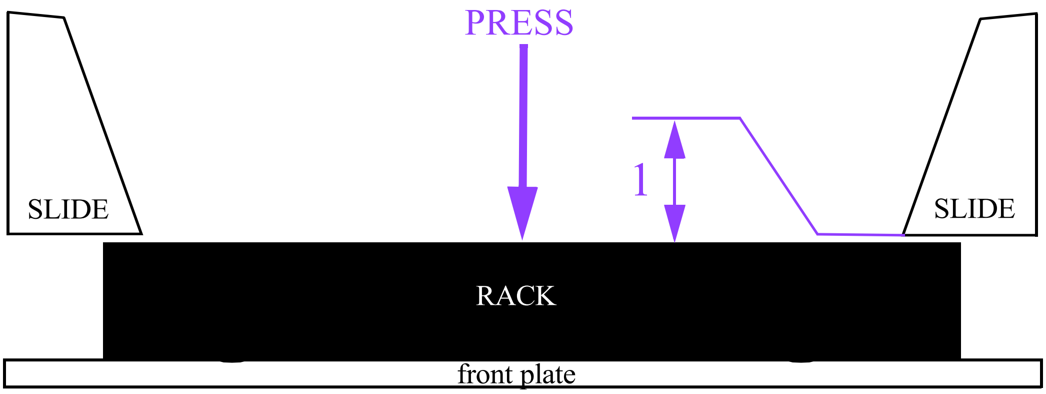
Diag.2 Max rack loading gap

Check the gap, then press validate button.
If the gap (1) is too small, decrease «Max Rack Loading» value.
If the gap (1) is too big, increase «Max Rack Loading» value.
Repeat the procedure until you get the correct adjustment.

1.2. Stop Rack Loading

«Stop Rack Loading» value represent the number of steps after switches detection, to ensure correct rack position.

Put a rack on Loading Tray, then press **Check Stop Rack** button (See Diag.1 “Sampler adjustment menu”, page 2).
When motion is ended, make sure there is a bit of play between Slides,rack and Front Plate:
Press rack on the Front Plate, then check play (1) between rack and Slides.It must be around 0.5 mm (See Diag.3 “Rack and Front Plate play”, page 3).



Diag.3 Rack and Front Plate play

Make sure that motor does not loose steps (noise) when Slides come against the rack, because it can return a little bit if motion is too big.

If play (1) is too big : increase «Stop Rack Loading» value.
If play (1) is too small : decrease «Stop Rack Loading» value.
Repeat the procedure until you get the correct adjustment.

2. Mixer mechanism check & adjustment

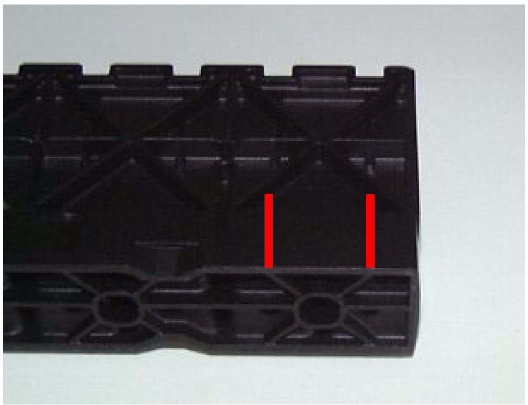
Mixer adjustments are factory made and parameters are writing on a label on mixer body.
They must not be modify, but if necessary, follow «Mixer replacement» procedure (RAS346).

3. Transfer mechanism check & adjustment

«Transfer home» value represents the offset of Transfer Carriage. Follow the procedure in this order, because First Transfer and Rack Ejection are depending on Transfer Home.

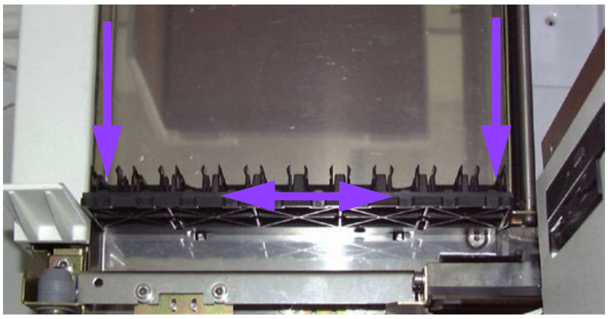
3.1. Transfer Home

On a rack side, mark off the hole center position with a pencil (See Diag.4 “Rack Mark”, page 4).



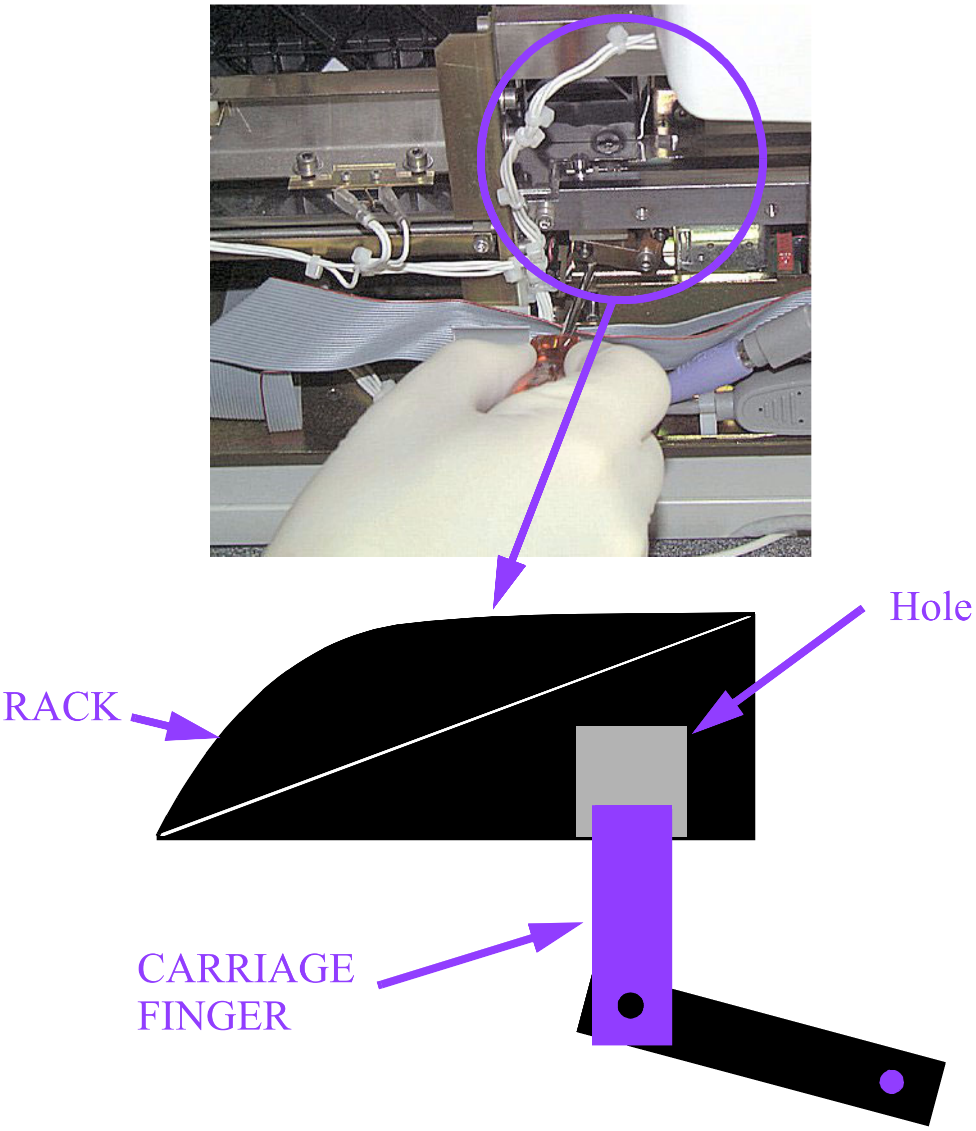
Diag.4 Rack Mark

Put the rack on Loading Tray, and adjust it on the center, to have the same left and right gap (See Diag.5 “Rack position”, page 4).



Diag.5 Rack position

Press **Check Transfer Home** button (See Diag.1 “Sampler adjustment menu”, page 2).
When carriage is coming under rack, gently push finger up to check position (use screwdriver or pencil). Carriage Finger must be adjusted in hole center (See Diag.6 “Carriage position”, page 5).



Diag.6 Carriage position

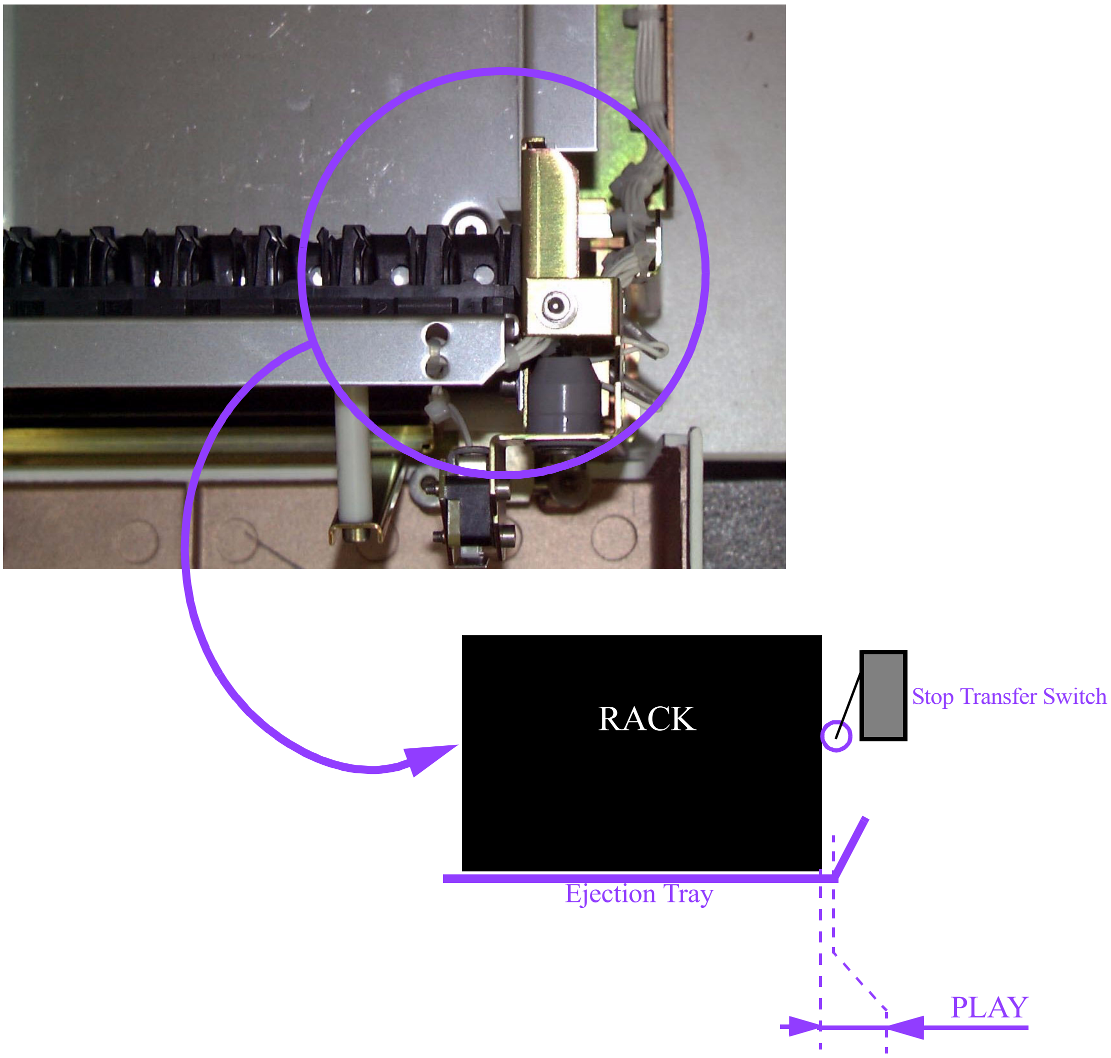
At the end of Transfer Carriage motion, Carriage motor is no more supplied. Make sure it does not move when you push finger up.

Adjust Transfer Home value to center Carriage Finger into rack hole:
If finger is on the right, increase «Transfer Home» value.
If finger is on the left, decrease «Transfer Home» value.
Press **Check Transfer Home** button to check position.
Repeat the procedure until you get the correct adjustment.

3.2. Stop Transfer

«Stop Transfer» value represent the number of steps after «Stop Transfer switch detection». After Transfer motion, you have only 4 seconds to chek position before rack ejection.

Put the rack on Loading Tray.
Press **Check Stop Transfer** button (See Diag.1 “Sampler adjustment menu”, page 2).
At the end of transfer motion, before ejection, make sure there is a bit of play (around 0.5 mm) between mechanical stop (Ejection Tray side) and rack (See Diag.7 “End of transfer”, page 6).



Diag.7 End of transfer

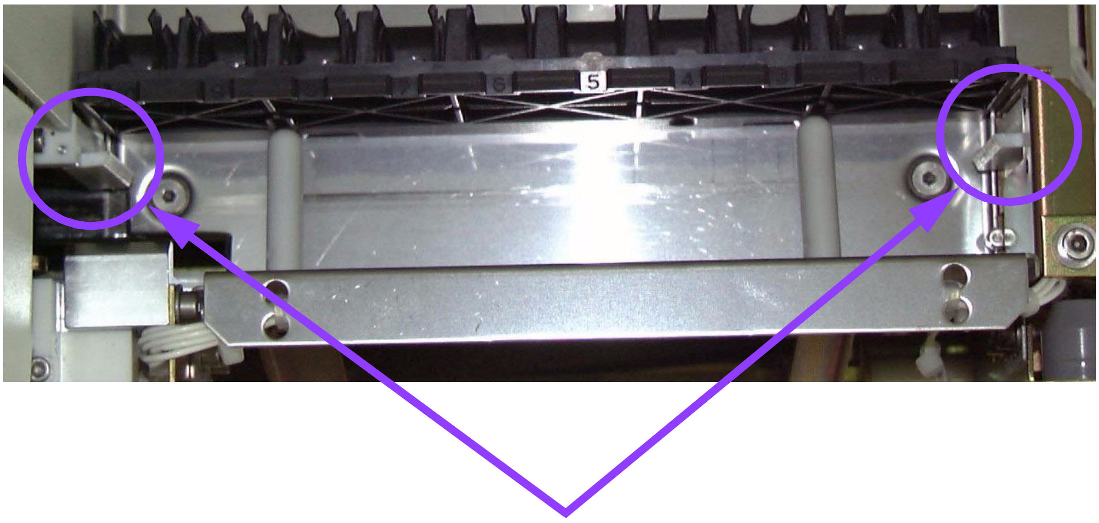
Make sure that motor does not loose steps (noise) at the end of transfer motion.

If rack is too much on right, decrease «Stop Transfer» value.
If rack is too much on left, increase «Stop Transfer» value.
Repeat the procedure until you get the correct adjustment.

3.3. Rack Ejection

«Rack Ejection» value is the number of steps run by the Transfer Carriage to move Ejection Assembly.

Put one rack on Loading Tray and nine racks in Ejection Tray, against Ejection stops, to make sure it can push ten racks.
Press **Check Rack Ejection** button (See Diag.1 “Sampler adjustment menu”, page 2).
At the end of cycle, rack must be out of **«Ejection stops»** but ejection assembly must not be at mechanical stop (See Diag.8 “Rack ejection”, page 7).



EJECTION STOPS

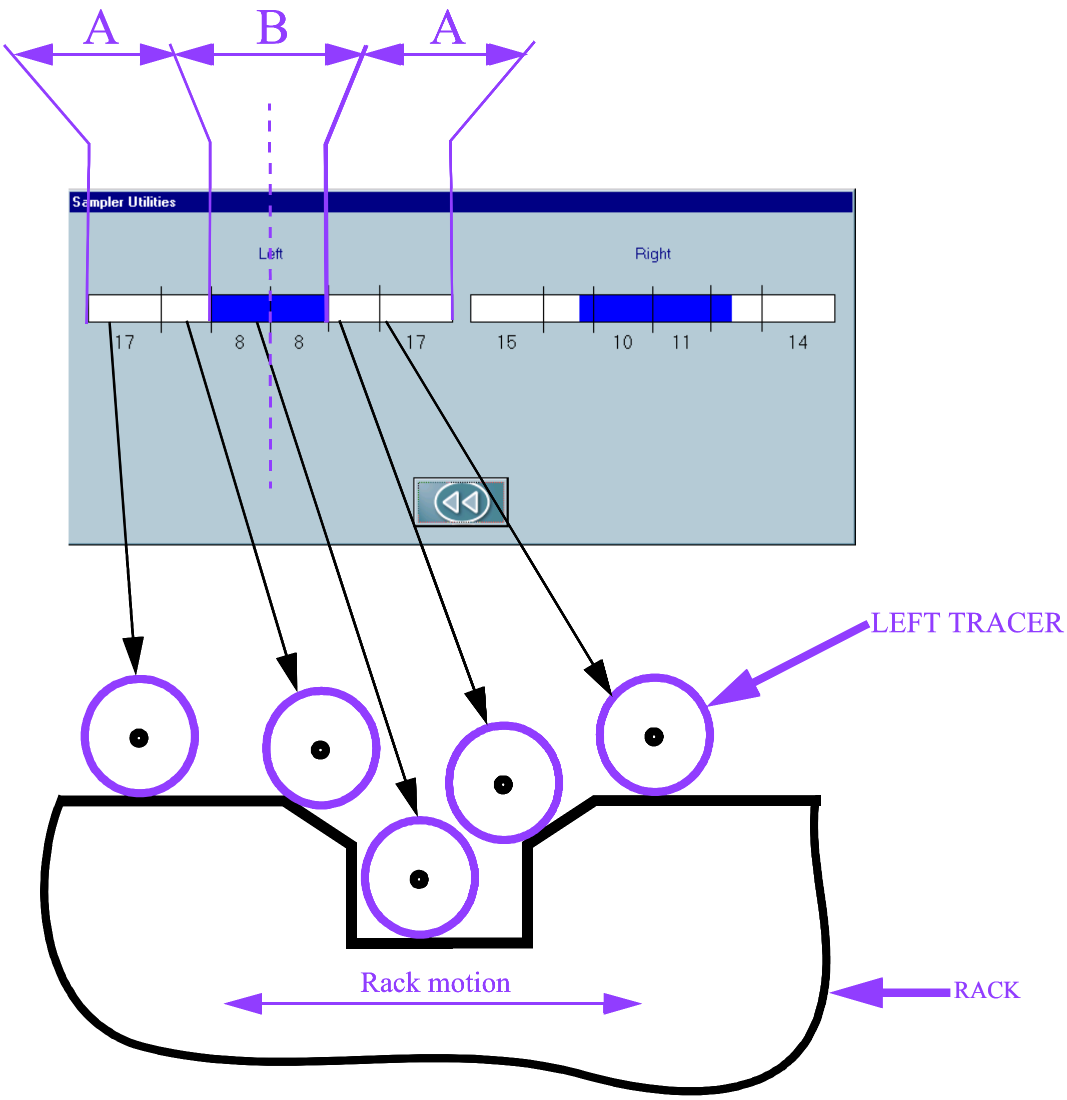
Diag.8 Rack ejection

If rack is not out of **«Ejection stops»** increase «Rack Ejection Value».
If rack is too much out of **«Ejection stops»**, or at mechanichal stop, decrease «Rack Ejection Value».
Repeat the procedure until you get the correct adjustment.

3.4. First Transfer

«First Transfer» value represents the number of steps of the First Carriage motion.Other motions are always the same, representing space between two tube positions on the rack. Adjust this value to center rack position under the two Tracers (followers).

Put the rack on Loading Tray.
Press **Check Rack Transfer Movement** button (See Diag.1 “Sampler adjustment menu”, page 2).
Rack moves under Tracers (followers), then it run 25 motions on the left and 25 on the right.
The following screen shows the detection (A) and non-detection (B) zones of the Tracer switches (See Diag.9 “Tracers detection”, page 8).
Increase or decrease «First Transfer» value to center non-detection zone (B) on bargraph.
If non-detection zone is on right, decrease «First Transfer» value.
If non-detection zone is on left, increase «First Transfer» value.
Adjust it to have 9 +/-2 motions on each side of the middle bar (See Diag.9 “Tracers detection”, page 8).
Tracers (followers) position adjustments are factory made and non-detection zone (B) width is depending on tracers up and down position.
If you have to move left tracer, for example during mixer replacement, keep right tracer for reference.


A
B
A
Sampler Utilities
Left
Right
17
8
8
17
15
10
11
14
LEFT TRACER
Rack motion
RACK

Diag.9 Tracers detection

MDSS Technology pentra 80

Internal PC Replacement Procedure

RAS348AA

HORIBA DIAGNOSTICS

- Concerns

  Dismantling of the internal PC

- Required tools

  Allen keys

- Required products

  None

- Intervention time

  10 min.

- Frequency

  On request

- Specific kit or consumables

  None

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. PC dismantling

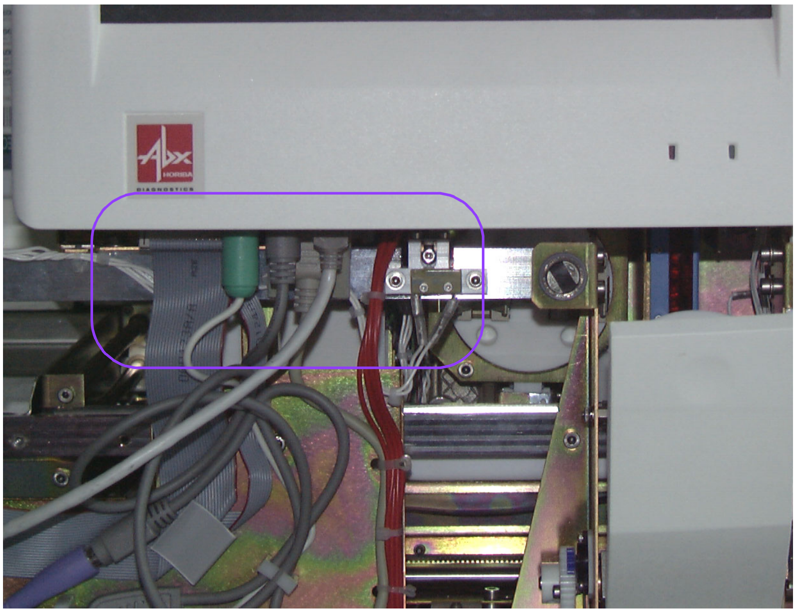
PC Hard Disk may contains some user’s specific datas (Worklist, Archives, etc...) if the PC is replaced these informations won’t be accessible.

Switch the instrument off and disconnect power supply cable.

Remove the side and top covers of the instrument (for further details refer to procedure RAS342 Front panel & Covers dismantling)

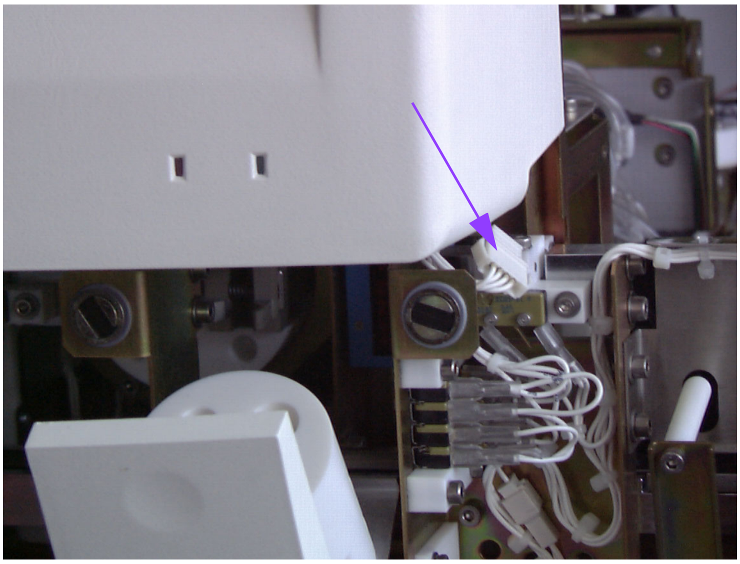
Disconnect PC’s accessories (See Diag.1:“PC disconnection”, page 2):

- Mouse,
- Keyboard,
- RS and Printer ports,
- Local network.



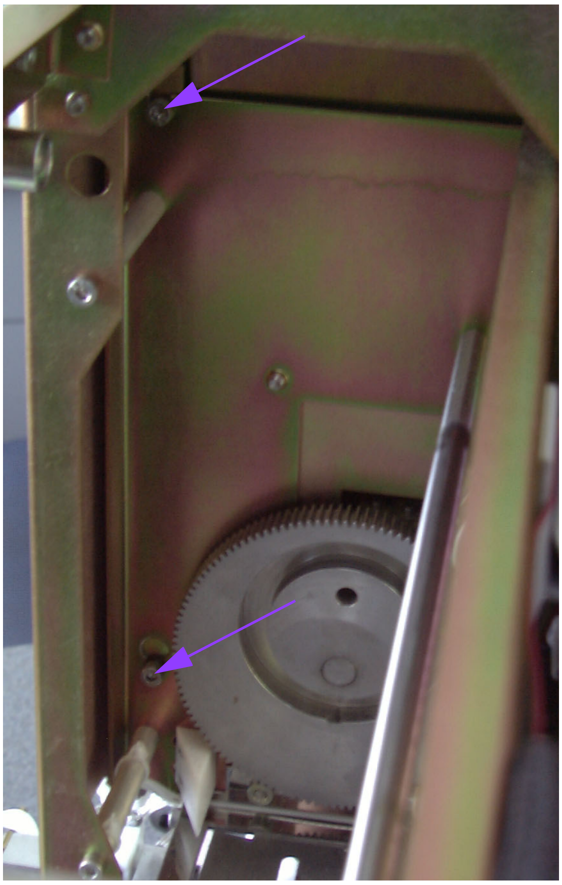
Diag.1:PC disconnection

Disconnect the LED connector (See Diag.2:“LED connector”, page 2).

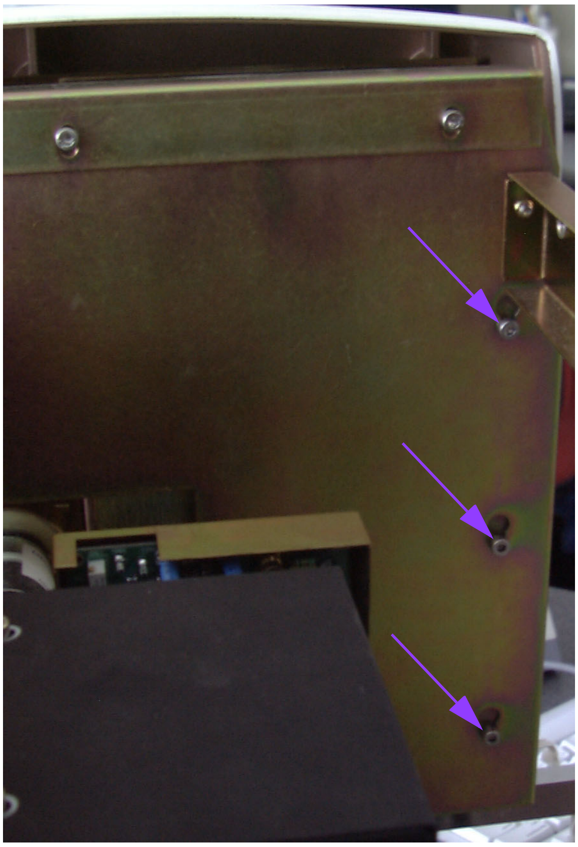


Diag.2:LED connector

Untight the PC fixation screws (See Diag.3:“Righthand side PC fixation screws”, page 3 & See Diag.4:“Lefthand side PC fixation screws”, page 4).



Diag.3:Righthand side PC fixation screws



Diag.4:Lefthand side PC fixation screws

Lift and carrefully remove the PC.

2. PC installation

Install the PC and tight the fixation screws (See Diag.3:“Righthand side PC fixation screws”, page 3 & See Diag.4:“Lefthand side PC fixation screws”, page 4).

Connect the PC’s accessories (See Diag.1:“PC disconnection”, page 2).

Connect the LED connector (See Diag.2:“LED connector”, page 2).

Connect the main supply and start the instrument.

Logon and check the instrument works properly.

MDSS Technology pentra 80

PC Hard Disk Replacement Procedure

RAS349AA

- Concerns

  PC Hard Disk replacement

- Required tools

  Allen Keys

- Required products

  None

- Intervention time

  1 hour

- Frequency

  On request

- Specific kit or consumables

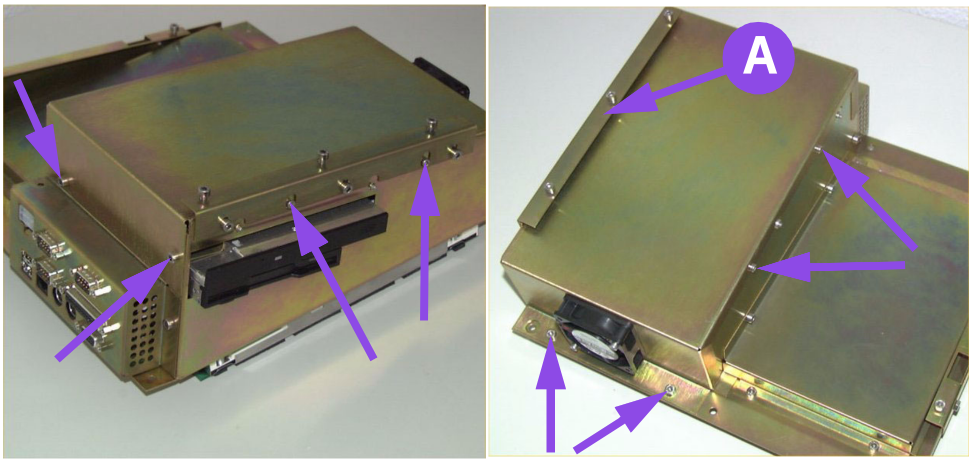
  Hard Disk kit: XAA510AS

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

If it’s possible, save configuration before following this procedure (See RAS 357).

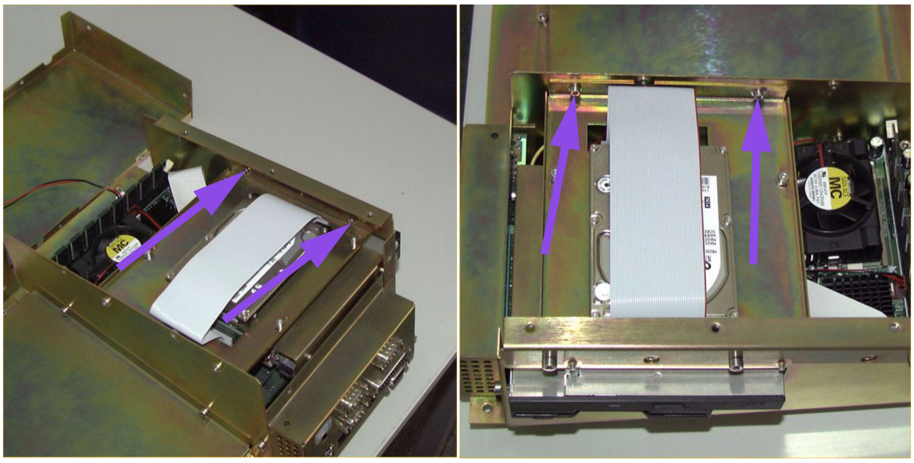
Remove internal PC (See RAS348).
Unscrew the 6 CHC M4x6 screws to remove Internal PC from the cover.
Unscrew the 4 CHC M3x6 and the 4 CHC M4x6 screws (See “Cover plate + fan”, page 2).

Do not remove Left Angle Plate (A) in order to keep the PC/Cover adjustment.



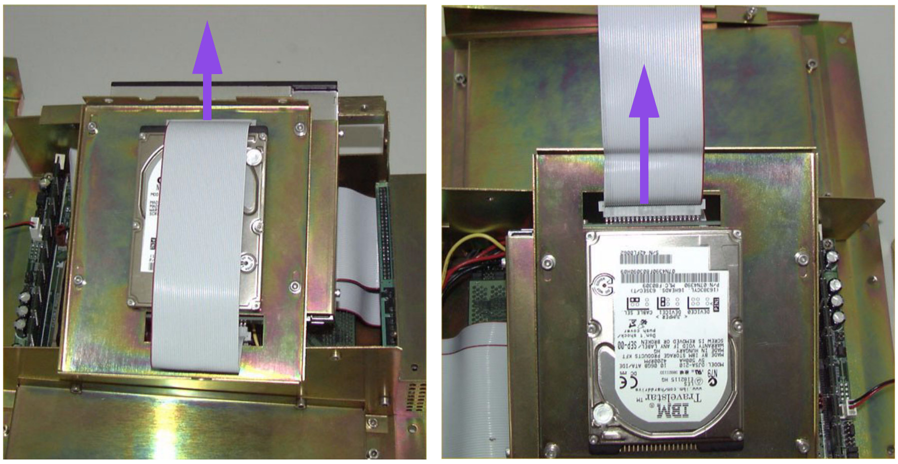
Diag.1: Cover plate + fan

Disconnect fan and remove cover plate.
Unscrew the 4 CHC M3x6 screws + M3 Washers and lift «Hard disk + CD-ROM Drive + Floppy Reader» assy (See “Hd assy screws”, page 2).



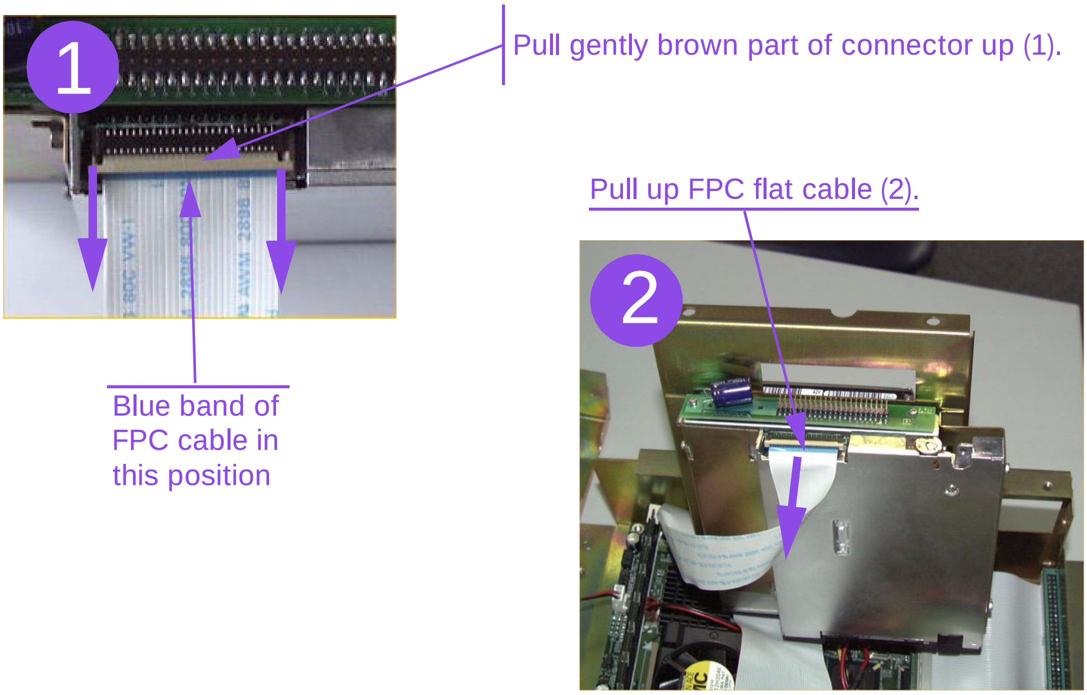
Diag.2: Hd assy screws

Disconnect flat cable from Hard Disk, then from CD-ROM Drive (See “Flat cable disconnection”, page 3).



Diag.3: Flat cable disconnection

Disconnect FPC cable from Floppy disk Reader and remove Drives Support with Hard Disk, Floppy Disk Reader and CD-ROM Reader (See “Floppy disk reader connection”, page 3).



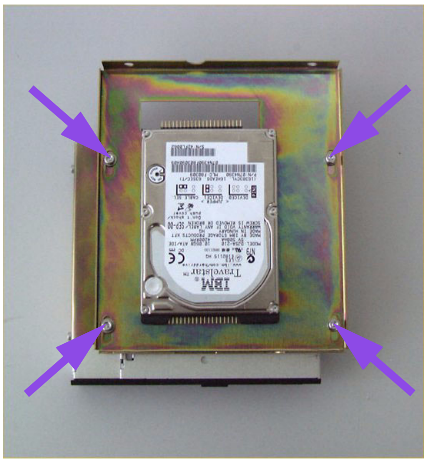
Pull gently brown part of connector up (1).

Pull up FPC flat cable (2).

Blue band of FPC cable in this position

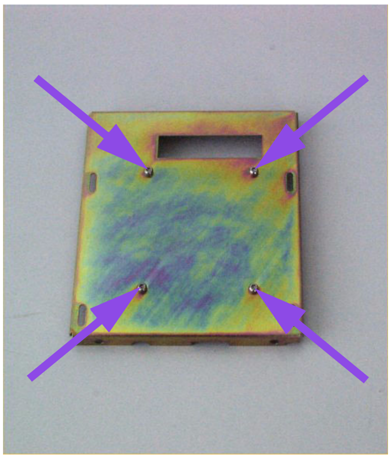
Diag.4: Floppy disk reader connection

Unscrew the 4 CHC M3x4 screws and remove Drives Support with Hard Disk (See “Drives support”, page 4).



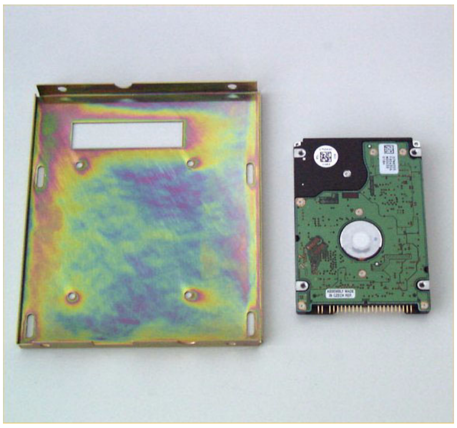
Diag.5: Drives support

Return Drives Support and unscrew the 4 CHC M3x4 screws to free Hard Disk (See “hard disk screws”, page 4).



Diag.6: hard disk screws

Remove Drives Support (See “Hard disk”, page 4).



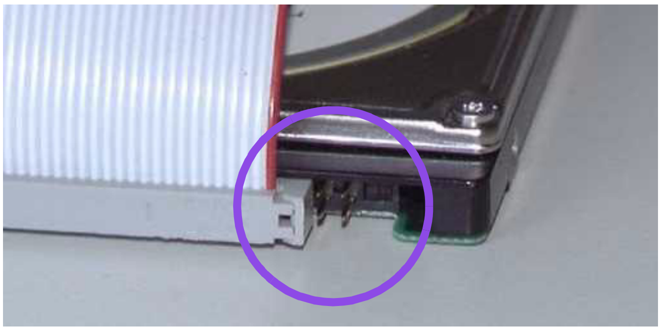
Diag.7: Hard disk

Change Hard Disk.

Hard Disk (reference XAA510AS) is formated and updated with last version of software.

Reassemble in reverse order.

Make sure that the flat cable connector is correctly plugged on Hard Disk because 4 pin are free (See “Hard disk connector”, page 5) and that blue band on FPC cable (Floppy disk reader connector) is in the correct position (See “Floppy disk reader connection”, page 3).



Diag.8: Hard disk connector

Restart system and restore configuration (See RAS357).

PC Mother Board Replacement Procedure

RAS350AA

- Concerns

  PC Mother board replacement

- Required tools
  - Allen Keys
  - Flat Screwdriver

- Required products

  None

- Intervention time

  1 hour

- Frequency

  On request

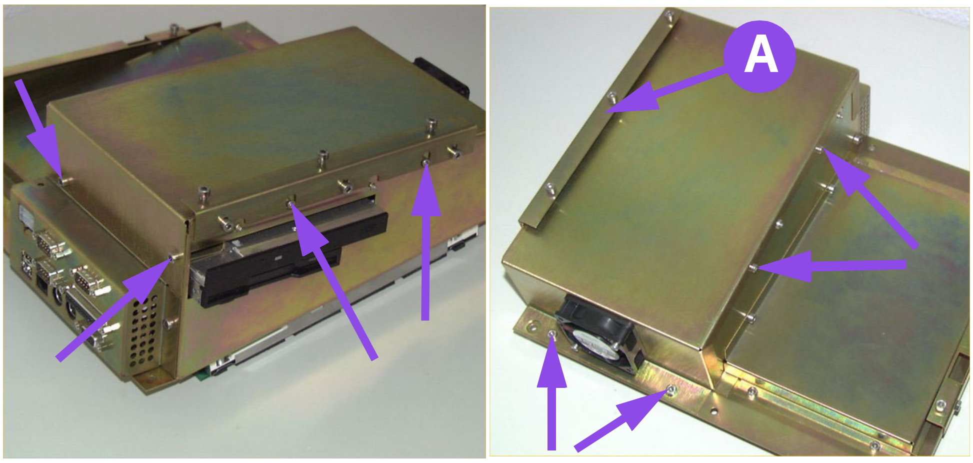
- Specific kit or consumables

  Mother Board kit: XAA509AS

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

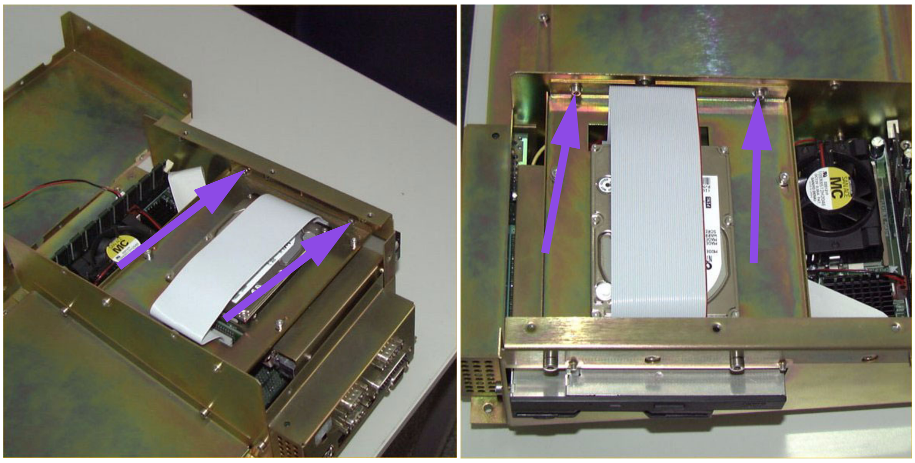
Remove internal PC (See RAS348).
Unscrew the 6 CHC M4x6 screws to remove Internal PC from the cover.
Unscrew the 4 CHC M3x6 and the 4 CHC M4x6 screws (See “Cover plate + fan”, page 2).

Do not remove Left Angle Plate (A) in order to keep the PC/Cover adjustment.



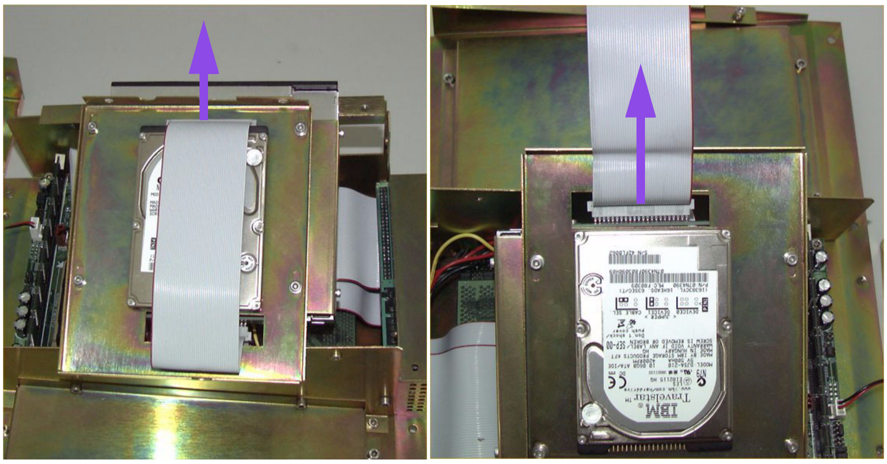
Diag.1: Cover plate + fan

Disconnect fan and remove cover plate.
Unscrew the 4 CHC M3x6 screws + M3 Washers and lift «Hard disk + CD-ROM Drive + Floppy Reader» assy (See “Hd assy screws”, page 2).



Diag.2: Hd assy screws

Disconnect flat cable from Hard Disk, then from CD-ROM Drive (See "Flat cable disconnection", page 3).

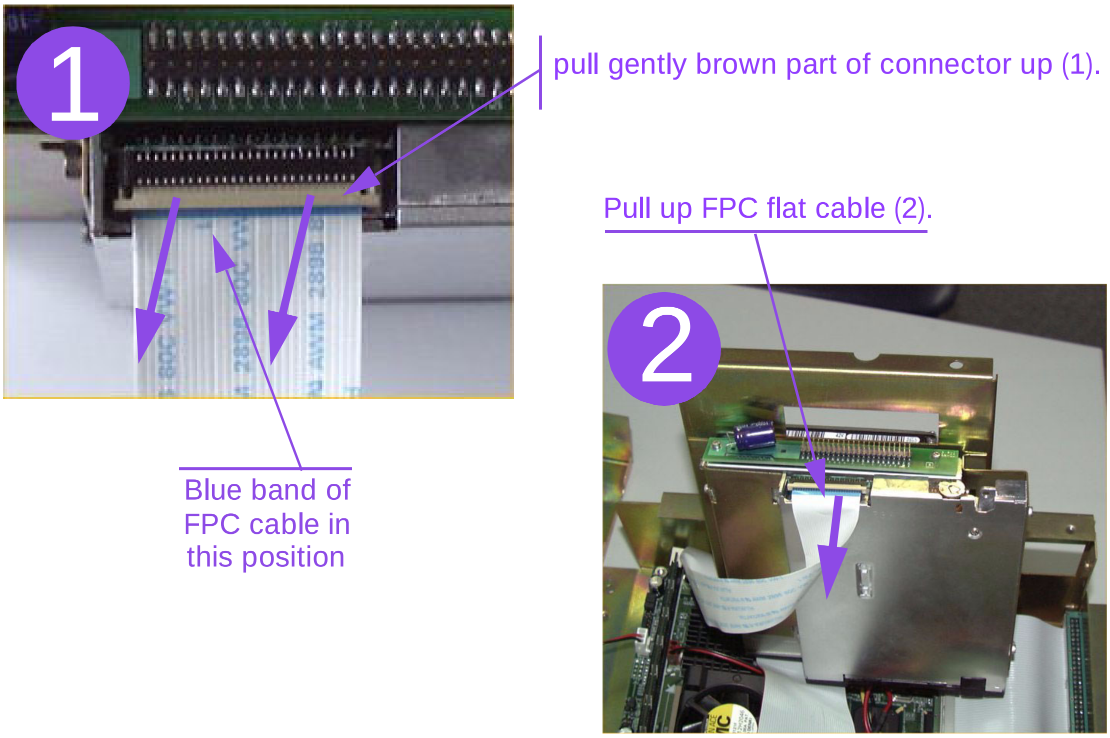


Diag.3: Flat cable disconnection

Before to disconnect FPC flat cable, pull gently on brown part of connector (1) to free the flat cable (See "Floppy disk reader connection", page 3).

Disconnect FPC cable (2) from Floppy disk Reader (See "Floppy disk reader connection", page 3).

Remove Drives Support with Hard Disk, Floppy Disk Reader and CD-ROM Reader.



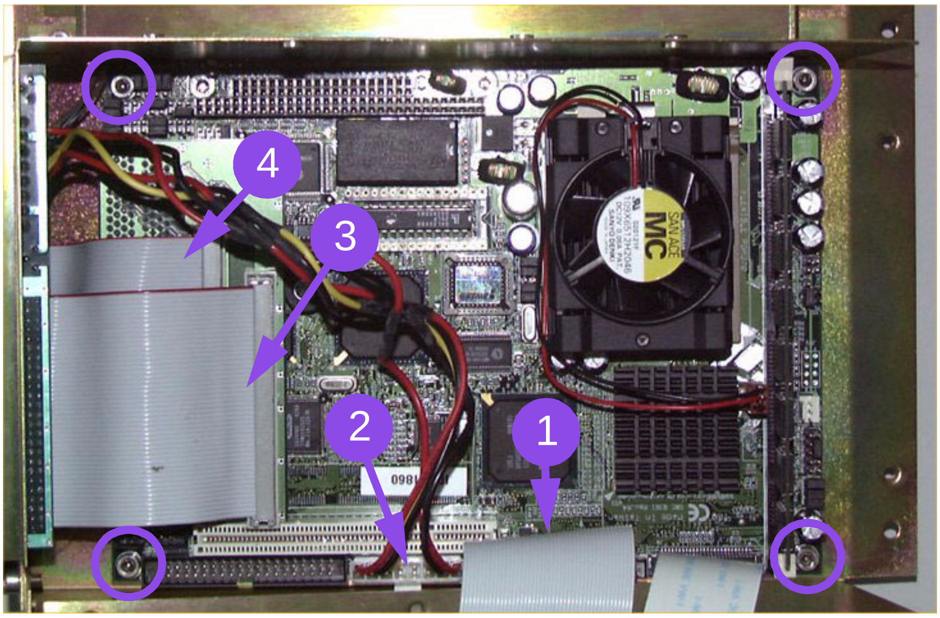
pull gently brown part of connector up (1).

Pull up FPC flat cable (2).

Blue band of FPC cable in this position

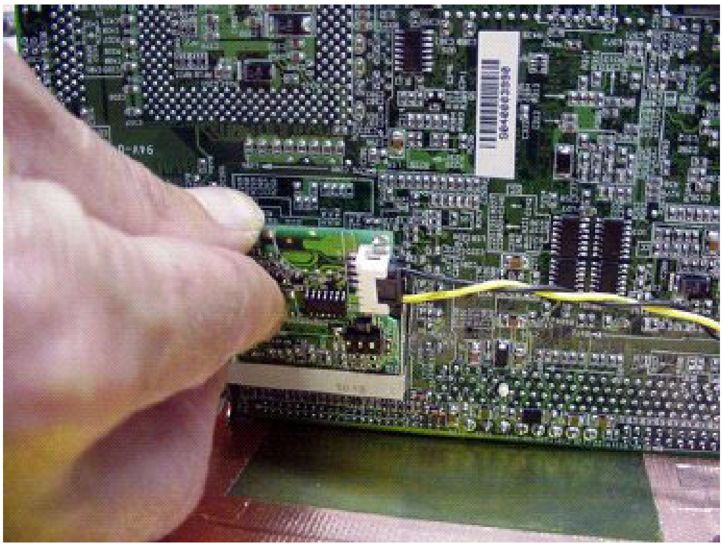
Diag.4: Floppy disk reader connection

Disconnect, Hard Disk / CD-ROM Drive «44 points» flat cable (1), Power cable (2, use a flat screwdriver) and the 2 «50 points» flat cables (3 and 4) on the daugther board (See "Mother board", page 4).



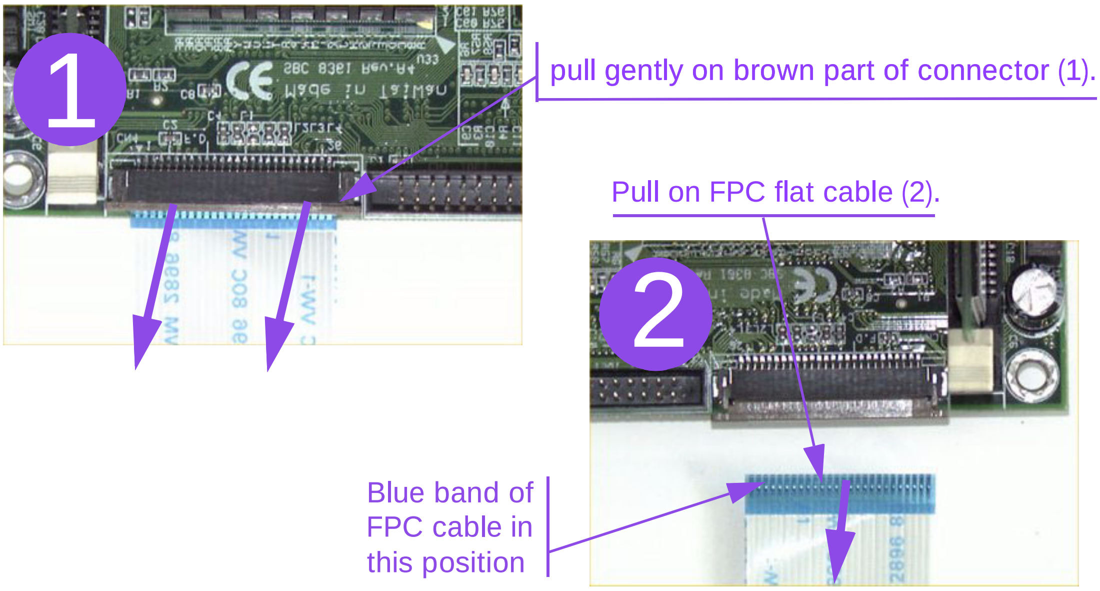
Diag.5: Mother board

Unscrew the 4 CHC M4x10 screws (See "Mother board", page 4).
Remove TFT Board located under Mother board (See "TFT board", page 4).



Diag.6: TFT board

Remove Mother Board and disconnect FPC flat cable (See "FPC flat cable connection", page 5).



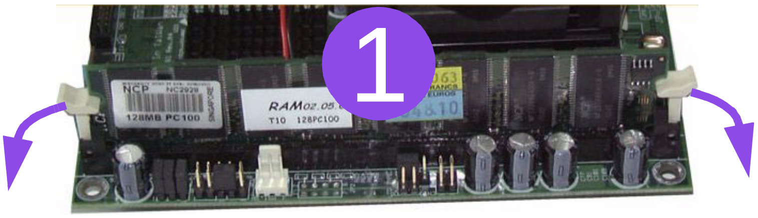
pull gently on brown part of connector (1).

Pull on FPC flat cable (2).

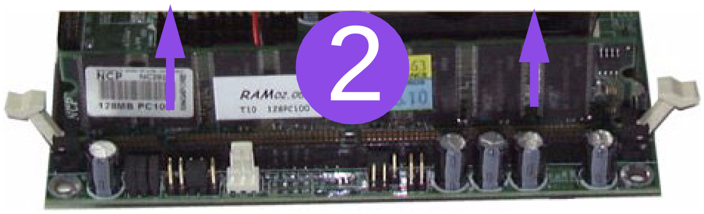
Blue band of FPC cable in this position

Diag.7: FPC flat cable connection

Remove SDRAM Board (See “SDRAM disconnection”, page 5).



1- Open the two fingers to free the RAM Board.

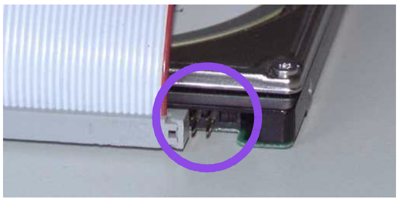


2 - Pull RAM Board up.

Diag.8:SDRAM disconnection

Change Mother Board (reference: XAA509AS) and reassemble in reverse order.

⚠ Make sure that the flat cable connector is correctly plugged on Hard Disk because 4 pin are free (See “Hard disk connector”, page 5) and that blue band on FPC cable (Floppy disk reader connector) is in the correct position on Floppy disk (See “Floppy disk reader connection”, page 3) and on Mother Board (See “FPC flat cable connection”, page 5).



Diag.9: Hard disk connector

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PC Floppy Disk Reader Replacement Procedure

RAS351AA

- Concerns

  PC floppy disk reader replacement

- Required tools

  Allen Keys

- Required products

  None

- Intervention time

  1 hour

- Frequency

  On request

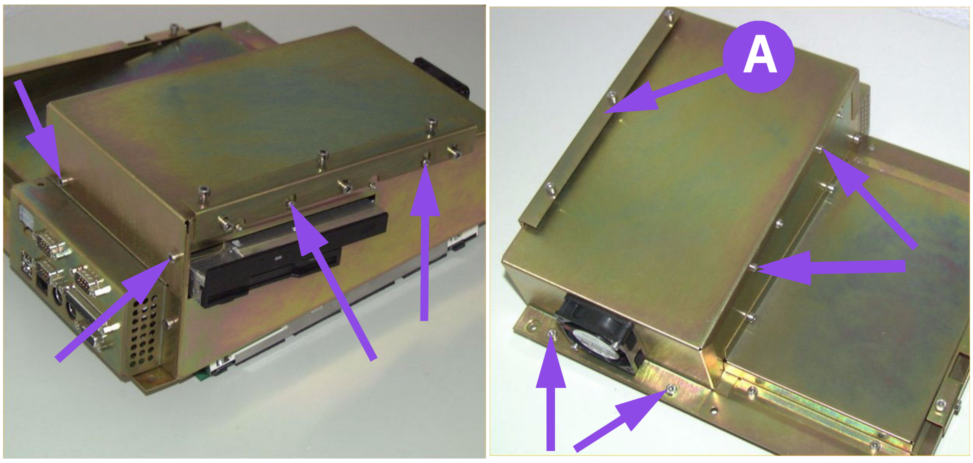
- Specific kit or consumables

  Floppy disk reader:CBT014A

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Remove internal PC (See RAS348).
Unscrew the 6 CHC M4x6 screws to remove Internal PC from the cover.
Unscrew the 4 CHC M3x6 and the 4 CHC M4x6 screws (See “Cover plate + fan”, page 2).

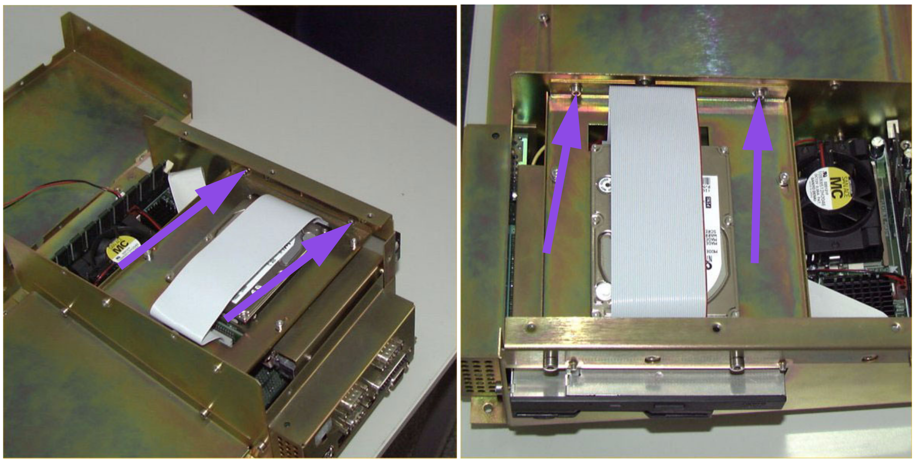
Do not remove Left Angle Plate (A) in order to keep the PC/Cover adjustment.



Diag.1: Cover plate + fan

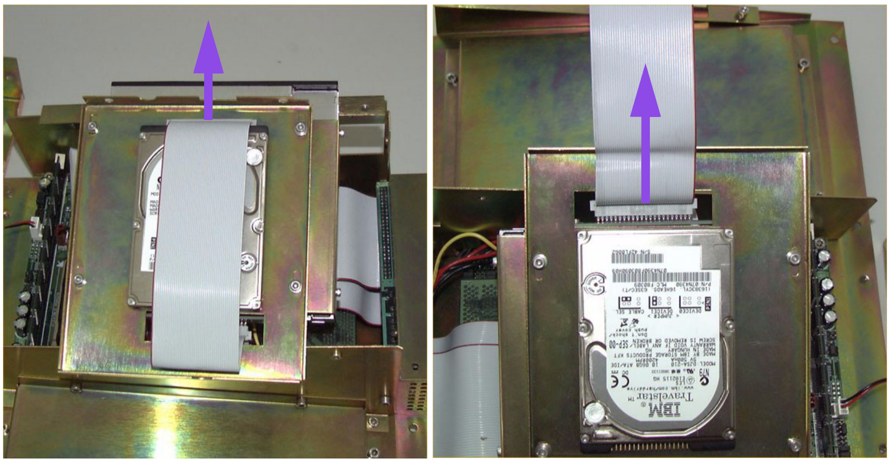
Disconnect fan and remove cover plate.

Unscrew the 4 CHC M3x6 screws + M3 Washers and lift «Hard disk + CD-ROM Drive + Floppy Reader» assy (See “Hd assy screws”, page 2).



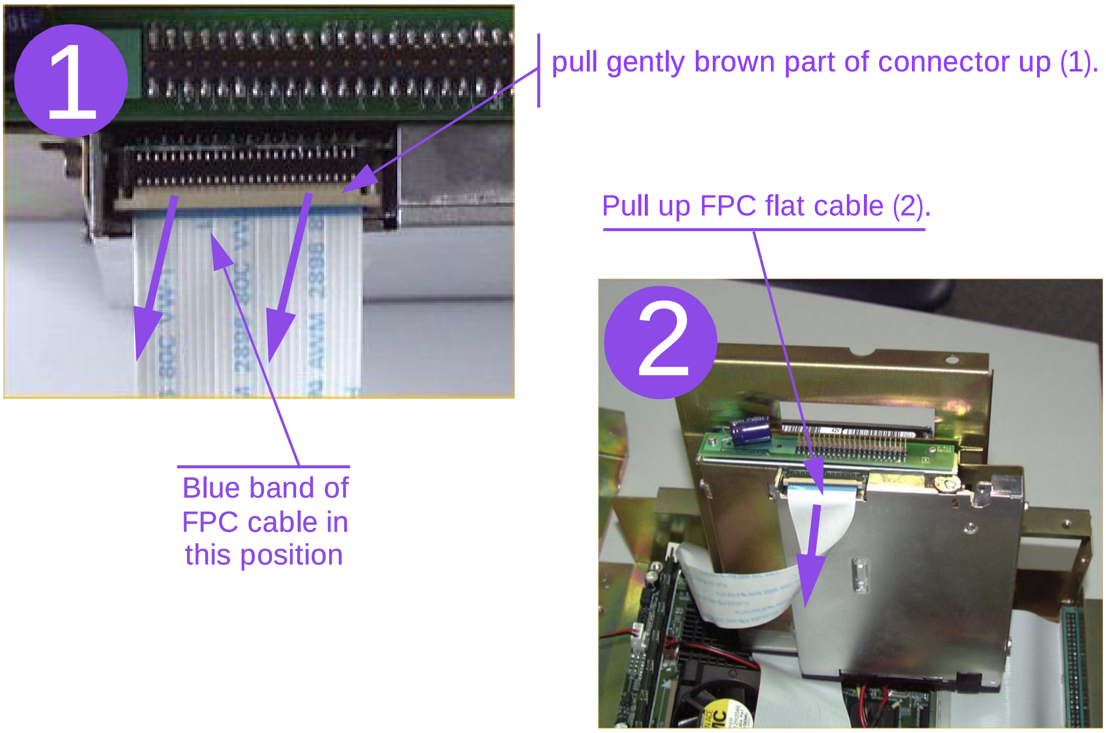
Diag.2: Hd assy screws

Disconnect flat cable from Hard Disk, then from CD-ROM Drive (See “Flat cable disconnection”, page 3).



Diag.3: Flat cable disconnection

Disconnect FPC cable from Floppy disk Reader (See “Floppy disk reader connection”, page 3).



pull gently brown part of connector up (1).

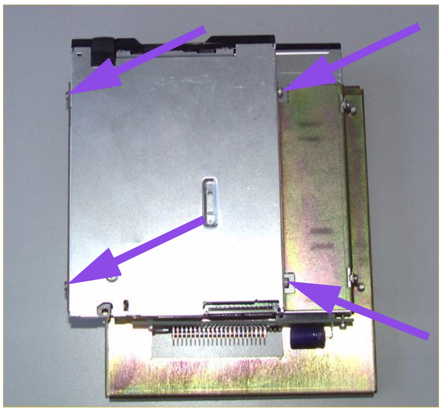
Pull up FPC flat cable (2).

Blue band of FPC cable in this position

Diag.4: Floppy disk reader connection

Remove Drives Support with Hard Disk, Floppy Disk Reader and CD-ROM Reader.

Unscrew the 4 CHC M2,5x3 then remove Floppy Disk Reader (See “Floppy disk reader screws”, page 4).

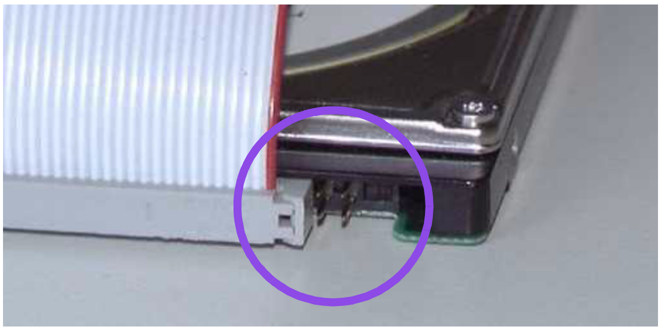


Diag.5: Floppy disk reader screws

Change Floppy Disk Reader (Reference: CBT014A) and reassemble in reverse order.

Make sure that FPC cable is correctly plugged with the blue band in correct position (See “Floppy disk reader connection”, page 3).

Make sure that the flat cable connector is correctly plugged on Hard Disk because 4 pin are free (See “Hard Disk connector”, page 4)



Diag.6: Hard Disk connector

MDSS Technology pentra 80

PC CD-ROM Drive Replacement Procedure

RAS352AA

HORIBA DIAGNOSTICS

- Concerns

  PC CD-ROM drive replacement

- Required tools

  - Allen Keys

- Required products

  None

- Intervention time

  1 hour

- Frequency

  On request

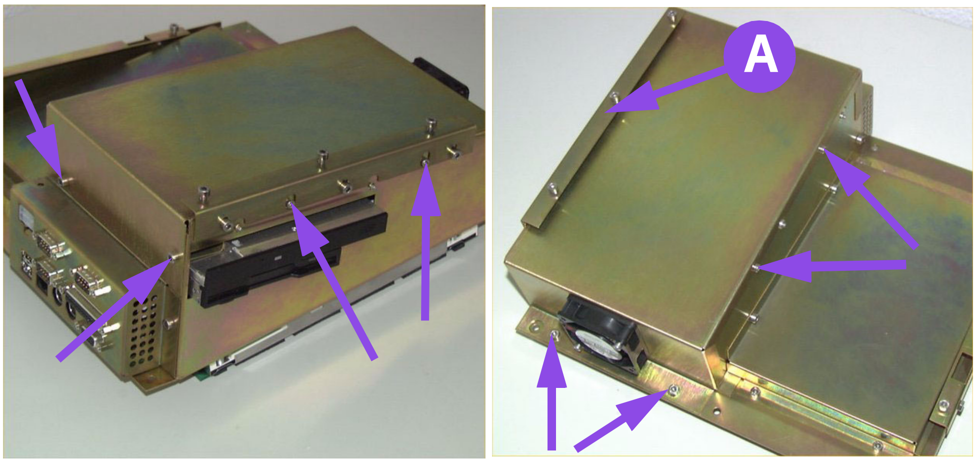
- Specific kit or consumables

  CD-ROM Drive: CBT013A

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

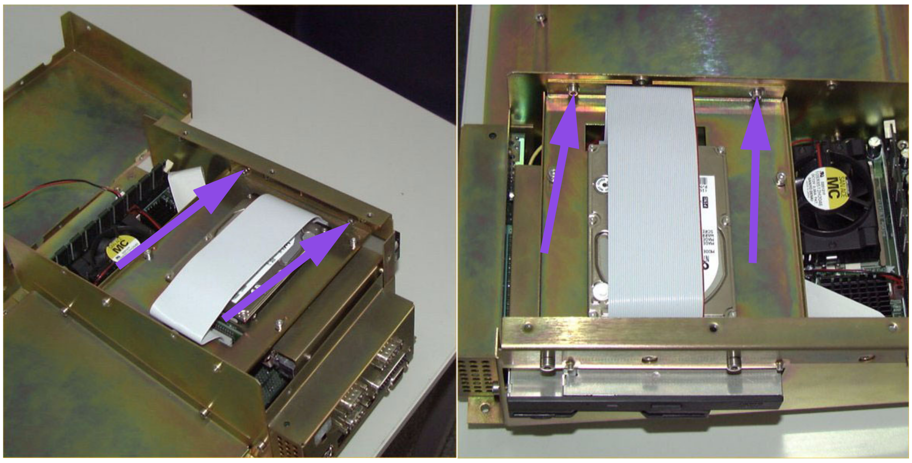
Remove internal PC (See RAS348).
Unscrew the 6 CHC M4x6 screws to remove Internal PC from the cover.
Unscrew the 4 CHC M3x6 and the 4 CHC M4x6 screws (See "Cover plate + fan", page 2).

Do not remove Left Angle Plate (A) in order to keep the PC/Cover adjustment.



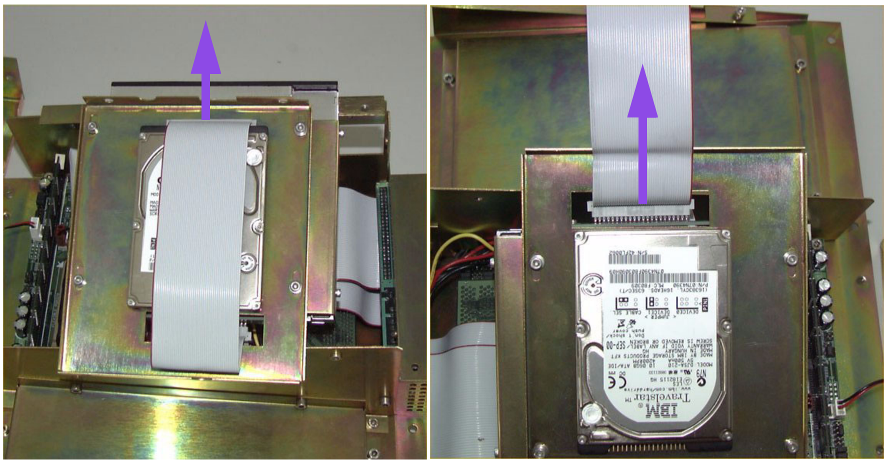
Diag.1: Cover plate + fan

Disconnect fan and remove cover plate.
Unscrew the 4 CHC M3x6 screws + M3 Washers and lift «Hard disk + CD-ROM Drive + Floppy Reader» assy (See "Hd assy screws", page 2).



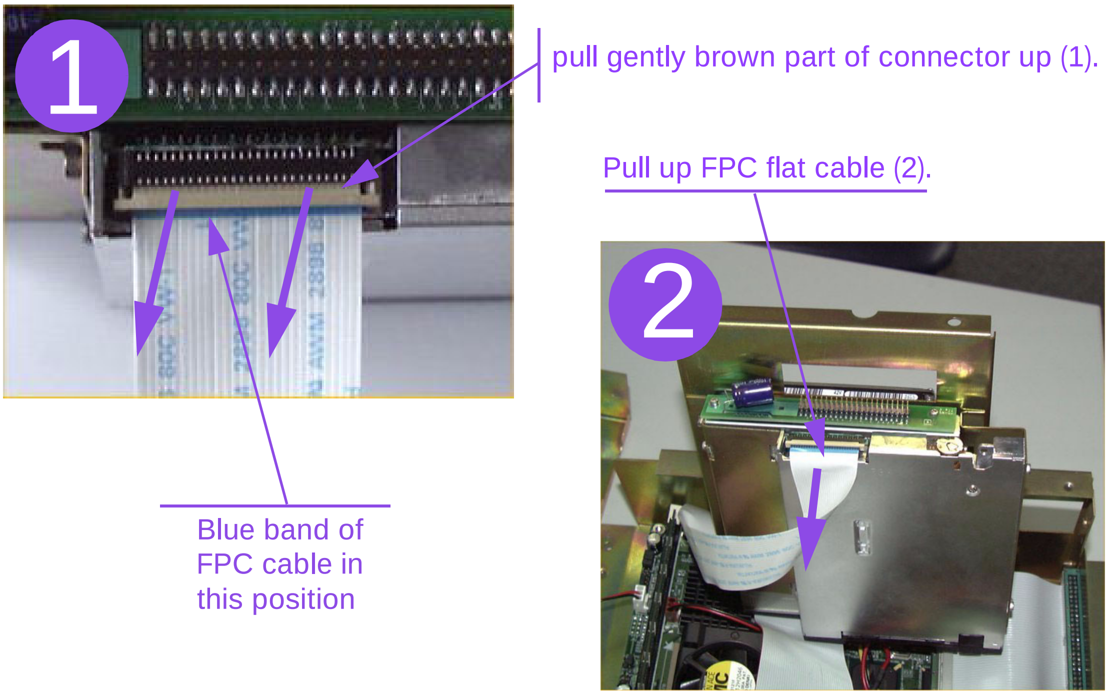
Diag.2: Hd assy screws

Disconnect flat cable from Hard Disk, then from CD-ROM Drive (See “Flat cable disconnection”, page 3).



Diag.3: Flat cable disconnection

Disconnect FPC cable from Floppy disk Reader (See “Floppy disk reader connection”, page 3).



pull gently brown part of connector up (1).

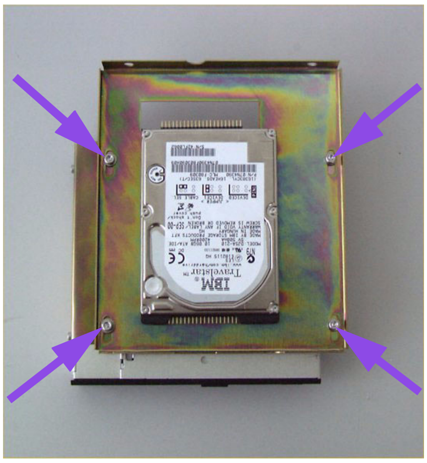
Pull up FPC flat cable (2).

Blue band of
FPC cable in
this position

Diag.4: Floppy disk reader connection

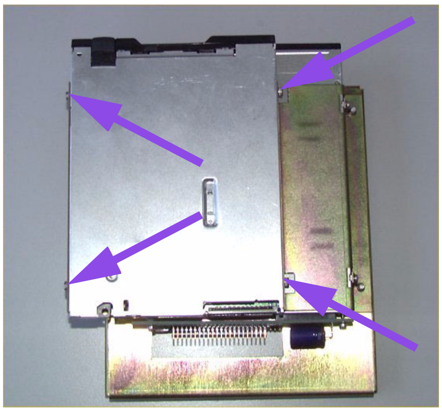
Remove Drives Support with Hard Disk, Floppy Disk Reader and CD-ROM Reader.

Unscrew the 4 CHC M3x4 screws and remove Drives Support with Hard Disk (See “Drives support”, page 4).



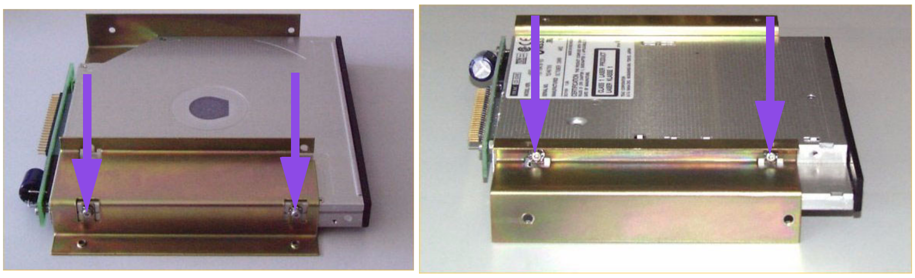
Diag.5: Drives support

Unscrew the 4 CHC M2,5x3 then remove Floppy Disk Reader (See “Floppy disk reader screws”, page 4).



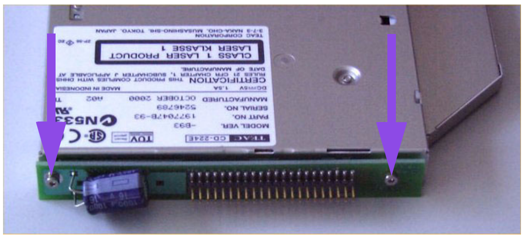
Diag.6: Floppy disk reader screws

Unscrew the 4 CHC M2x3 screws, with AZ 2,5 washers (See “CD-ROM drive screws”, page 4).



Diag.7: CD-ROM drive screws

Unscrew the 2 CHC M2x6 screws (See “CD-ROM board”, page 5) and remove board from CD-ROM drive (there is a nut between CD-ROM drive and board).

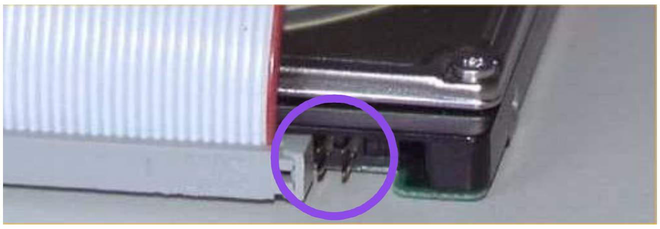


Diag.8: CD-ROM board

Change CD-ROM drive (Reference CBT013A) and reassemble in reverse order

Make sure that FPC cable is correctly plugged with the blue band in correct position (See “Floppy disk reader connection”, page 3).
Do not tighten too much different screws in order to not damage CD-ROM drive.

Make sure that the flat cable connector is correctly plugged on Hard Disk because 4 pin are free (See “Hard Disk connector”, page 5)



Diag.9: Hard Disk connector

MDSS Technology pentra 80

Instrument Mother Board Replacement Procedure

RAS354AA

HORIBA
DIAGNOSTICS

Concerns

Instrument mother board replacement

Required tools

- Allen Keys
- Voltmeter

Required products

None

Intervention time

30 min

Frequency

On request

Specific kit or consumables

Mother Board XAA456BS

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Before to change Mother Board, make sure that Analyser Settings are saved on a floppy disk or on Hard disk.
If not, follow RAS357 Procedure «Save and Restore Settings» to saved Analyser Settings.

1. Mother Board Acces:

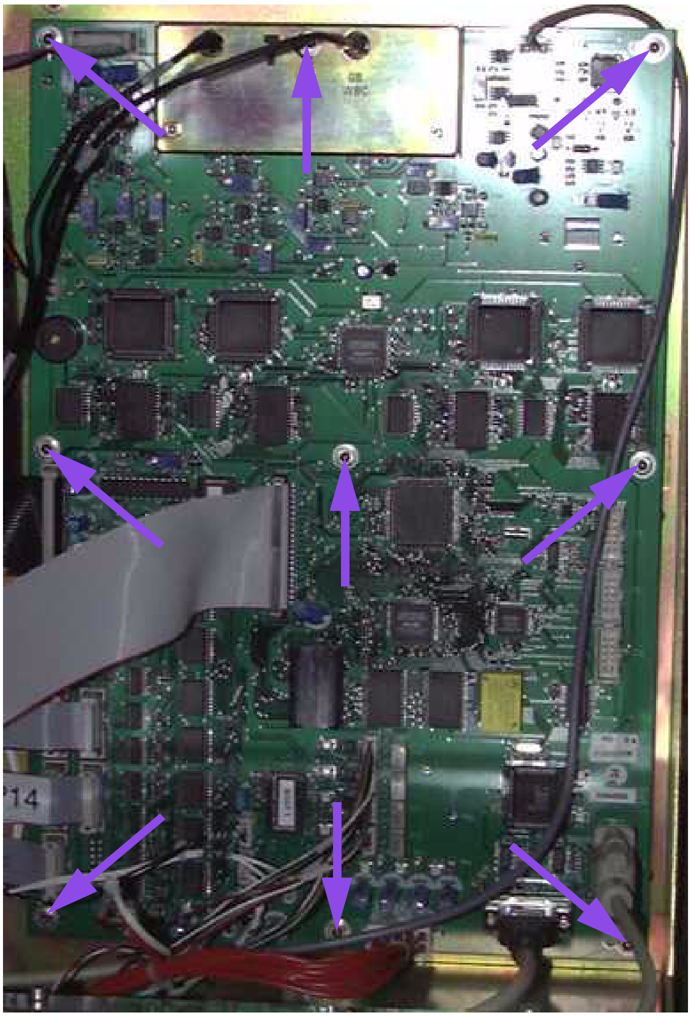
Mother board is located on righthand side of the instrument, at the rear.

- Switch the instrument off and disconnect power supply cable.
- Remove Right Front Cover.
- RemoveThermic Panel.
- Remove Right side cover.
- Remove the Plastic Protection by loosening the two CHC M4x6 Screws.

For further details, refer to procedure RAS342 Front panel & Covers dismantling.

2. Mother Board Dismantling:

Carefully disconnect all the connectors from the mother board.
Unscrew the 9 CHC M4x 6 Screws (See “Mother board srews”, page 2).

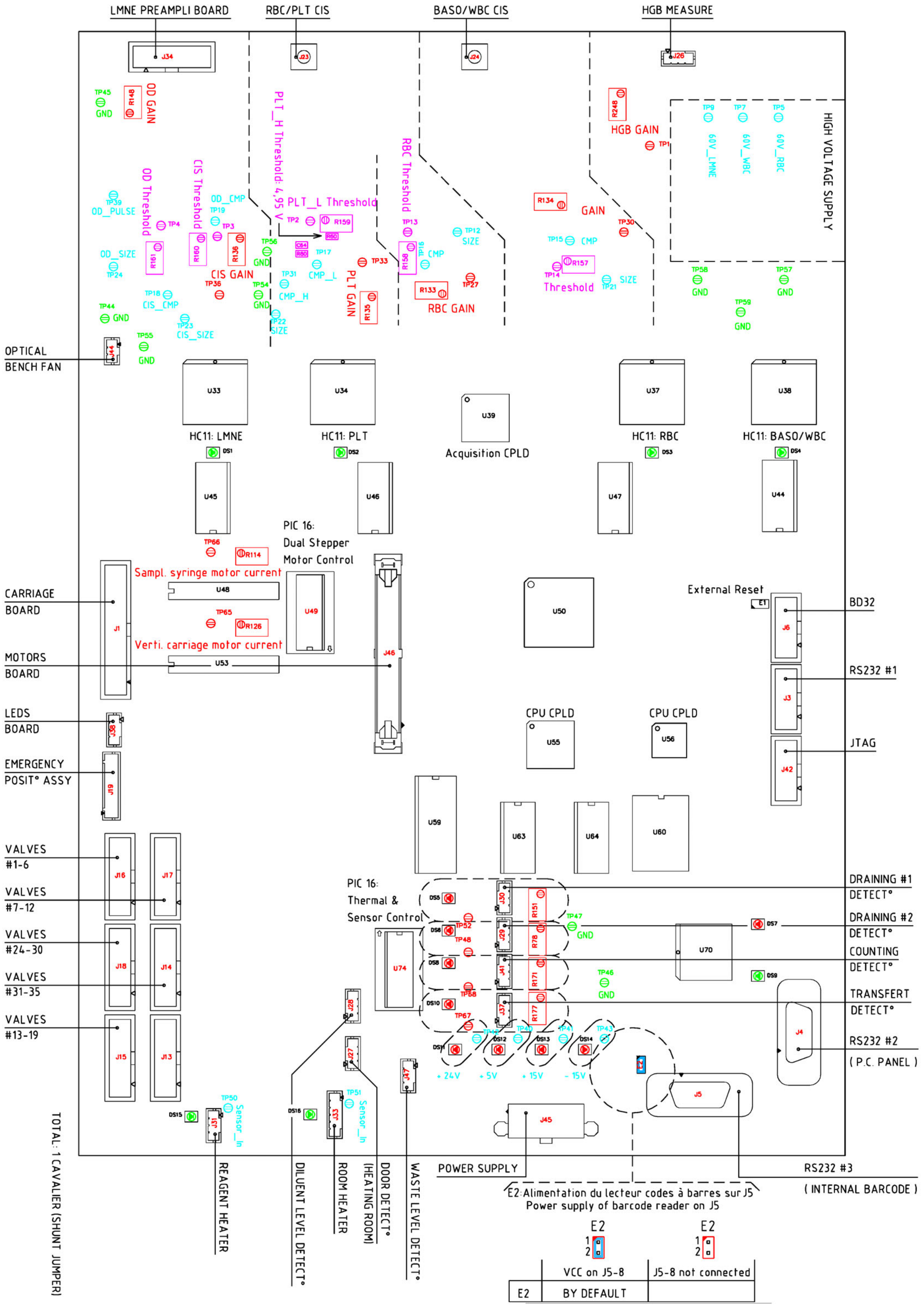


Diag.1:Mother board srews

Remove Mother Board.

3. Mother Board Replacement:

Install new Mother Board and screw the 9 CHC M4x 6 screws.
Connect all the connectors on the board (See "Main board connections", page 3).


LMNE PREAMPLI BOARD
RBC/PLT CIS
BASO/WBC CIS
HGB MEASURE
J34
J23
J24
J26
OD GAIN
OD Threshold
CIS Threshold
PLT_H Threshold: 4,95 V
PLT_L Threshold
RBC Threshold
HGB GAIN
HIGH VOLTAGE SUPPLY
60V_LMNE
60V_WBC
60V_RBC
GAIN
Threshold
SIZE
CMP
OD_PULSE
OD_CMP
OD_SIZE
CIS_CMP
CIS_SIZE
CIS GAIN
CMP_L
CMP_H
PLT GAIN
RBC GAIN
GND
OPTICAL BENCH FAN
U33
U34
U37
U38
U39
HC11: LMNE
HC11: PLT
Acquisition CPLD
HC11: RBC
HC11: BASO/WBC
U45
U46
U47
U44
PIC 16: Dual Stepper Motor Control
Sampl. syringe motor current
Verti. carriage motor current
U48
U49
U53
U50
J46
CARRIAGE BOARD
J1
MOTORS BOARD
LEDS BOARD
EMERGENCY POSIT° ASSY
External Reset
E1
BD32
J6
RS232 #1
J3
JTAG
J42
CPU CPLD
U55
CPU CPLD
U56
U59
U63
U64
U60
VALVES #1-6
VALVES #7-12
VALVES #24-30
VALVES #31-35
VALVES #13-19
J16
J17
J18
J14
J15
J13
PIC 16: Thermal & Sensor Control
U74
U70
DRAINING #1 DETECT°
DRAINING #2 DETECT°
COUNTING DETECT°
TRANSFERT DETECT°
RS232 #2 (P.C. PANEL)
J4
J5
J45
+ 24V
+ 5V
+ 15V
- 15V
TOTAL : 1 CAVALIER (SHUNT JUMPER)
REAGENT HEATER
DILUENT LEVEL DETECT°
ROOM HEATER (HEATING ROOM)
DOOR DETECT°
WASTE LEVEL DETECT°
Sensor_In
POWER SUPPLY
RS232 #3 (INTERNAL BARCODE)
E2:Alimentation du lecteur codes à barres sur J5
Power supply of barcode reader on J5
E2
E2
VCC on J5-8
J5-8 not connected
E2
BY DEFAULT

Diag.2:Main board connections

Switch on the instrument and adjust Mother Board (See RAS331: Main Board Adjustment).
Restore settings (See RAS357 Save and Restore Settings).
Put back the covers.

Motor board replacement Procedure

RAS355AA

- Concerns

Replacement of the motor electronic command board.

- Required tools

  - Hexagonal keys
  - Voltmeter

- Required products

None

- Intervention time

30min.

- Frequency

On request

- Specific kit or consumables

Motor board: XAA459AS

Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. How to access to motor board

The motor board is located under the sampler loarder system on the lefthand side of the instrument.

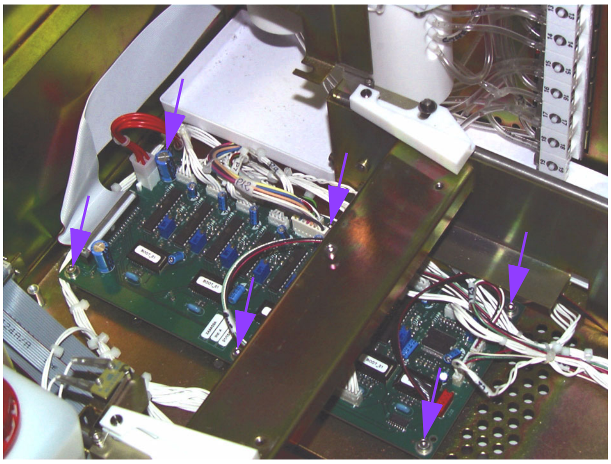
- Lift up the reagent cover and remove the bottles.
- Remove the plastic protection under the reagents.
- Remove the lefthand side panel of the instrument (4 screws).
- Remove the reagent frame under the plastic protection (5 screws).
- Remove the sampler loader inox plate (4 screws).
- Remove the motor board plastic protection (2screws).

For more details about the dismantling of the instrument covers refer to procedure RAS342 Front panel & Covers dismantling.

2. Motor board dismantling

Carefully disconnect all the connectors from the motor board.

Unscrew the 6 screws maintaining the board and remove it (See Diag.1: “Motor board dismantling”, page 2).



Diag.1:Motor board dismantling

3. Motor board replacement

Install the new board and tight the 6 fixation screws.

Connect all the connectors on the board.

Adjust motor board (See RAS332 Motor Board Adjustment).

Put back the covers.

Sensors check and adjustment Procedure

RAS356AA

- Concerns

  Sensors check and adjustment

- Required tools

  Allen keys

- Required products

  None

- Intervention time

  2 hours

- Frequency

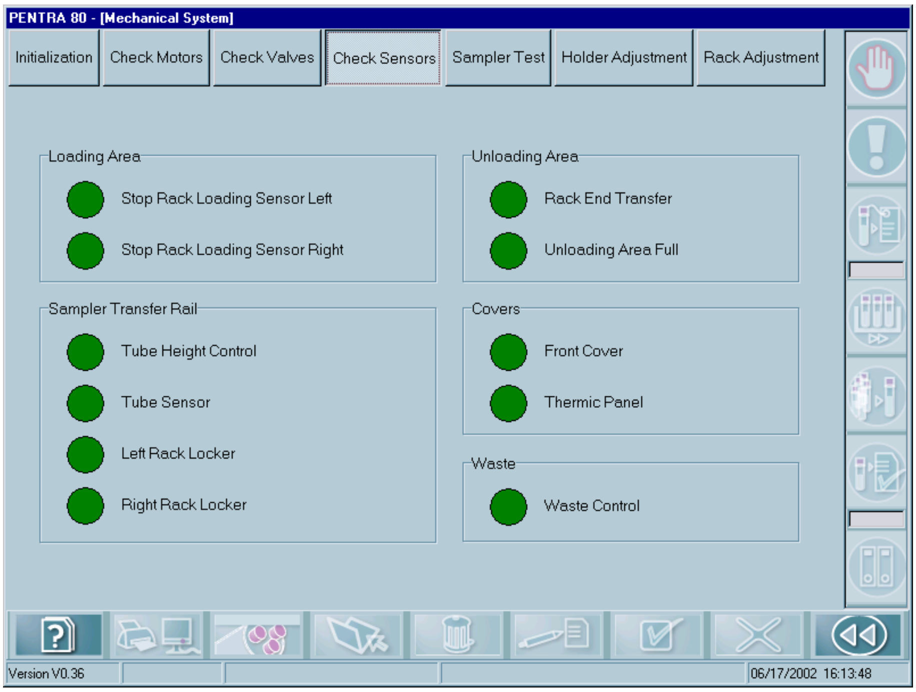
  On request

- Specific kit or consumables

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Sensor check:

Enter Menu: **Service/ Super User Menu / Mechanical / Check Sensors** (See “Check sensors screen”, page 2).



PENTRA 80 - [Mechanical System]

Initialization | Check Motors | Check Valves | Check Sensors | Sampler Test | Holder Adjustment | Rack Adjustment

Loading Area
- ● Stop Rack Loading Sensor Left
- ● Stop Rack Loading Sensor Right

Unloading Area
- ● Rack End Transfer
- ● Unloading Area Full

Sampler Transfer Rail
- ● Tube Height Control
- ● Tube Sensor
- ● Left Rack Locker
- ● Right Rack Locker

Covers
- ● Front Cover
- ● Thermic Panel

Waste
- ● Waste Control

Version V0.36 06/17/2002 16:13:48

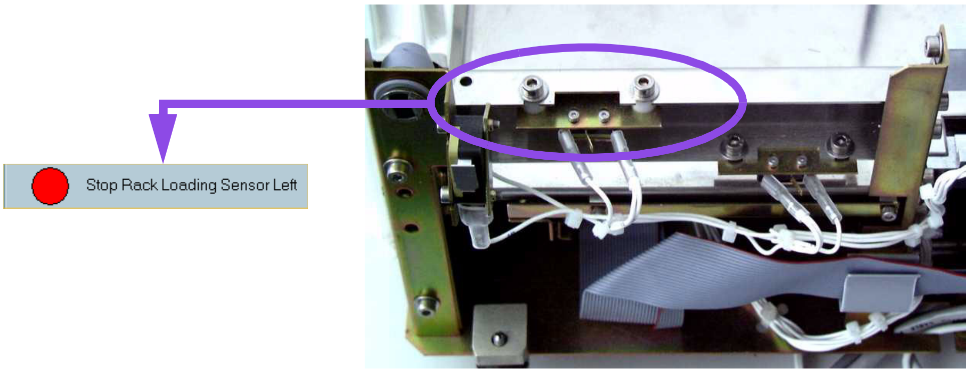
Diag.1: Check sensors screen

1.1. Loading area:

Remove **Left Front Cover** (See RAS342) to have acces to switches (Front cover status becomes red on previous screen).

Stop Rack Loading Sensor Left:

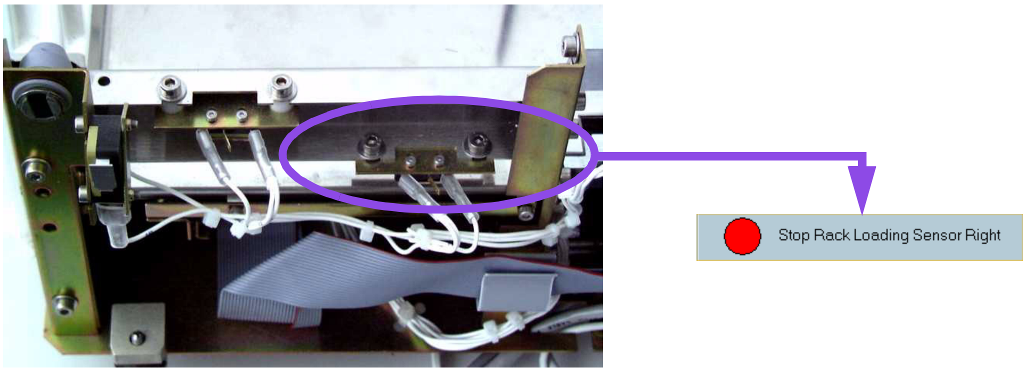
Push on sensor and check that **Stop Rack Loading Sensor Left** status becomes red (See “Stop rack loading sensor left”, page 2).



Diag.2: Stop rack loading sensor left

Stop Rack Loading Sensor Right:

Push on sensor and check that **Stop Rack Loading Sensor Right** status becomes red (See “Stop rack loading sensor right”, page 3).

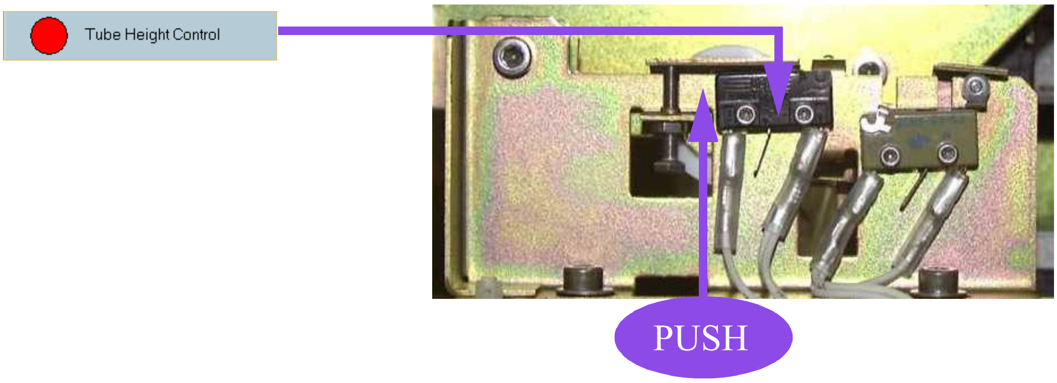

● Stop Rack Loading Sensor Right

Diag.3: Stop rack loading sensor right

1.2. Sampler Transfer Rail:

Tube Height Control:

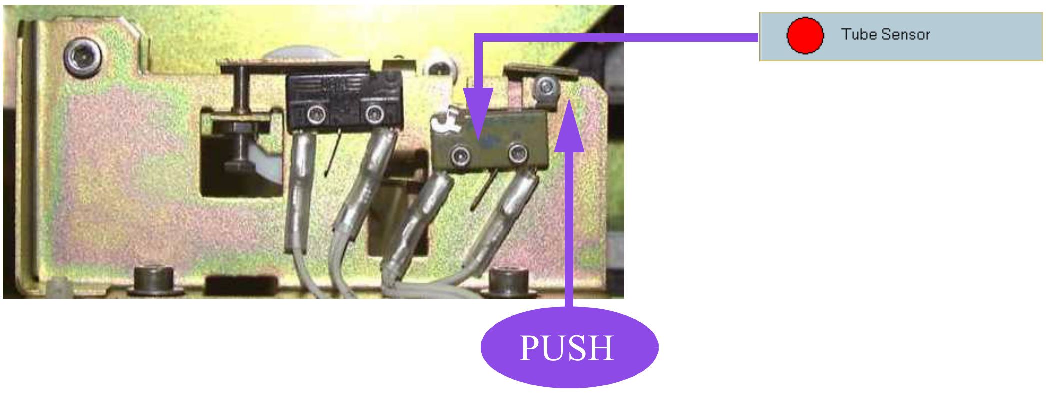
Push on sensor lever and check that **Tube Height Control** status becomes red (See "Tube heigt control", page 3).


● Tube Height Control
PUSH

Diag.4:Tube heigt control

Tube Sensor:

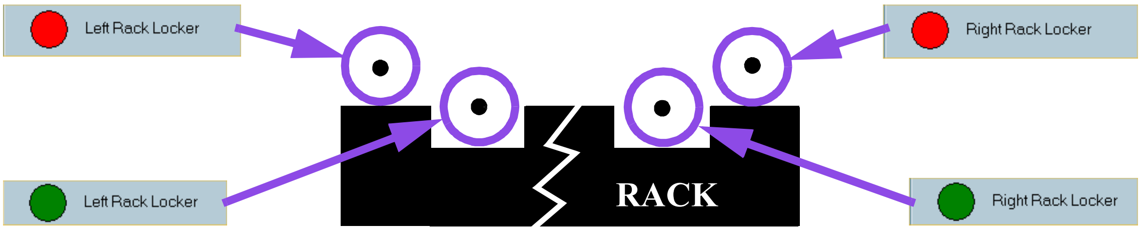
Push on sensor lever and check that **Tube Sensor** status becomes red (See "Tube sensor", page 3).


● Tube Sensor
PUSH

Diag.5:Tube sensor

Left Rack Locker / Right Rack Locker:

Push a rack in the rail until it comes under the tracers (followers) and check that **Left Rack Locker** and **Right Rack Locker** status becomes red when tracers are not in a hole of the rack (See "Left and right rack lockers”, page 4).

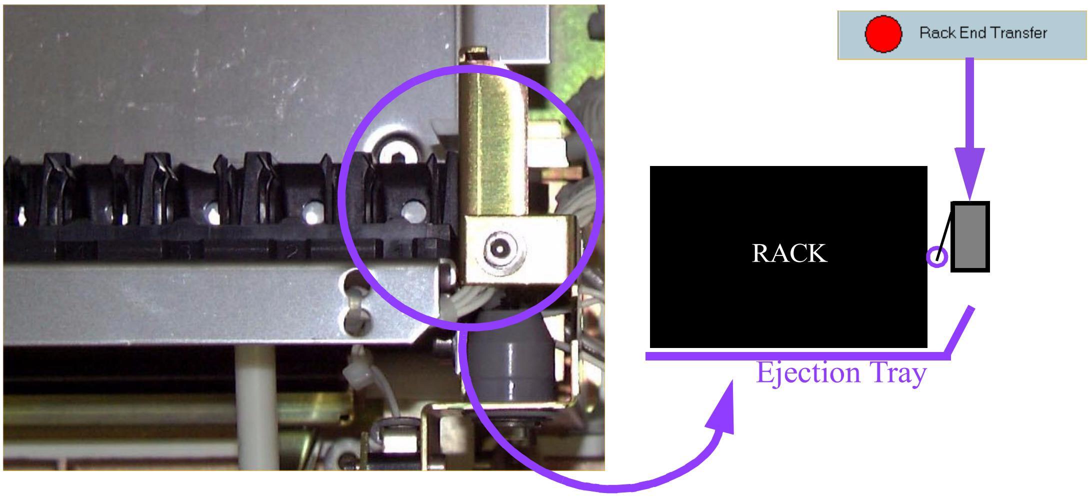

Left Rack Locker
Right Rack Locker
Left Rack Locker
Right Rack Locker
RACK

Diag.6: Left and right rack lockers

1.3. Unloading area:

Rack End Transfer:

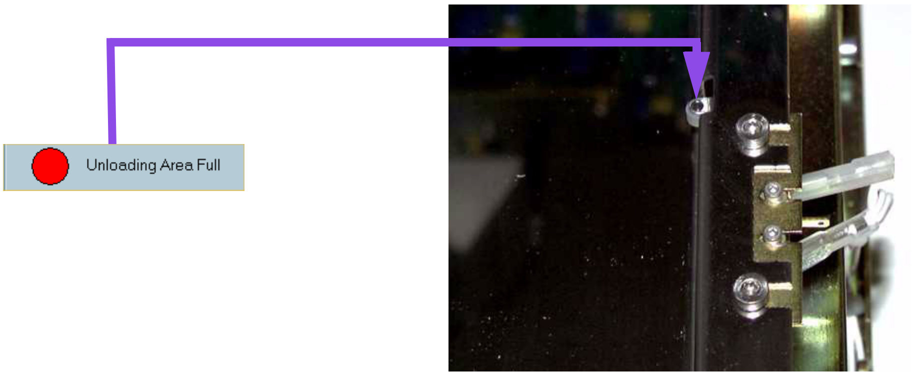
Push a rack in the rail until it comes in mechanical stop against unloading tray and check that **Rack End Transfer** status becomes red (See “Rack end transfer”, page 4).


Rack End Transfer
RACK
Ejection Tray

Diag.7: Rack end transfer

Unloading Area Full:

Push the Unloading Area Full switch and check that **Unloading Area Full** status becomes red (See “Unloading area full”, page 4).

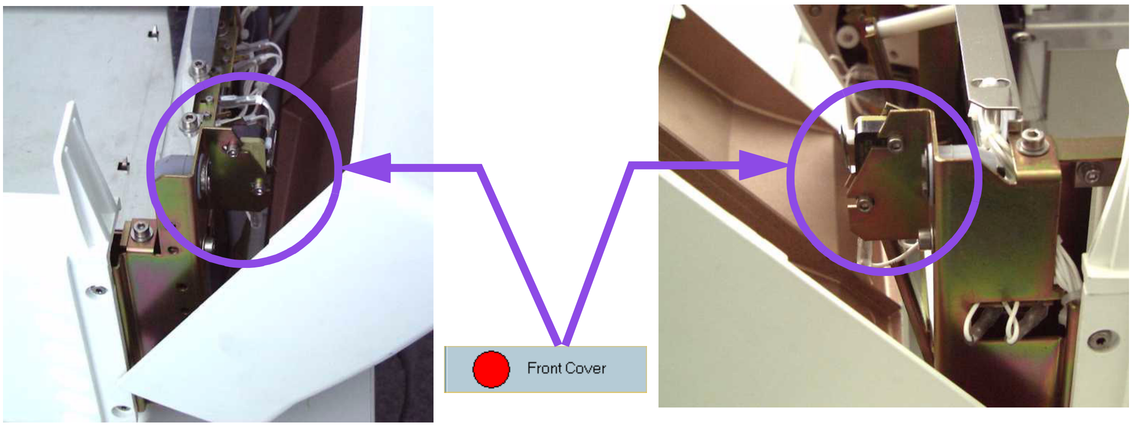

Unloading Area Full

Diag.8: Unloading area full

1.4. Covers:

Front cover:

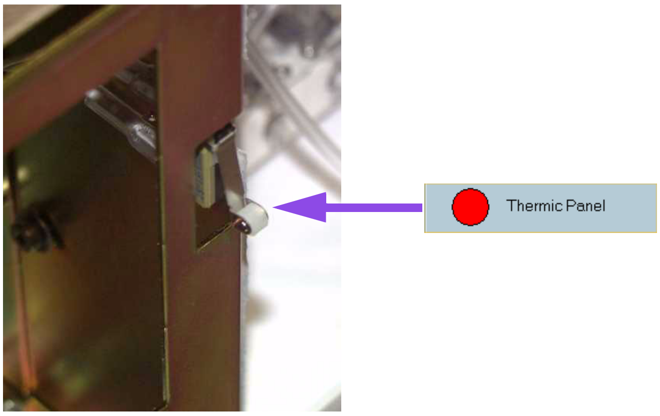
Open **Right Front Cover** and check that Front Cover status becomes red then close it and repeat this operation with **Left Front Cover** (See “Front cover”, page 5).



Diag.9: Front cover

Thermic Panel:

Open Thermic Panel and ckeck that **Thermic Panel** status becomes red (See “Thermic panel”, page 5).

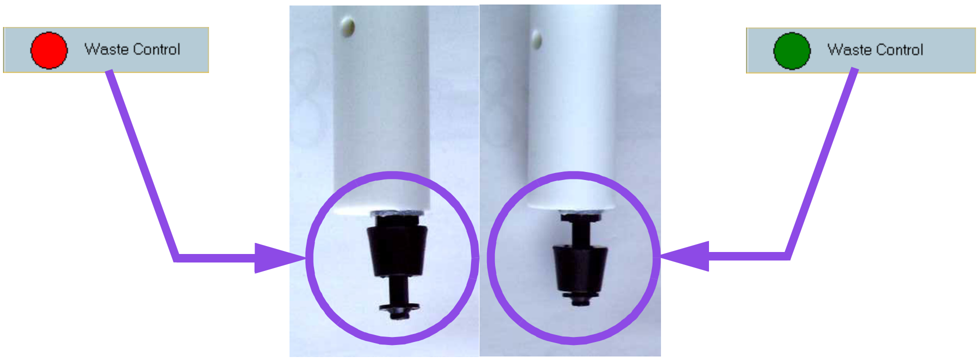


Diag.10:Thermic panel

1.5. Waste:

Waste Control:

Remove Waste Detector from waste, then move detector from the bottom up and check that **Waste Control** status becomes red (See “Waste control”, page 5).



Diag.11: Waste control

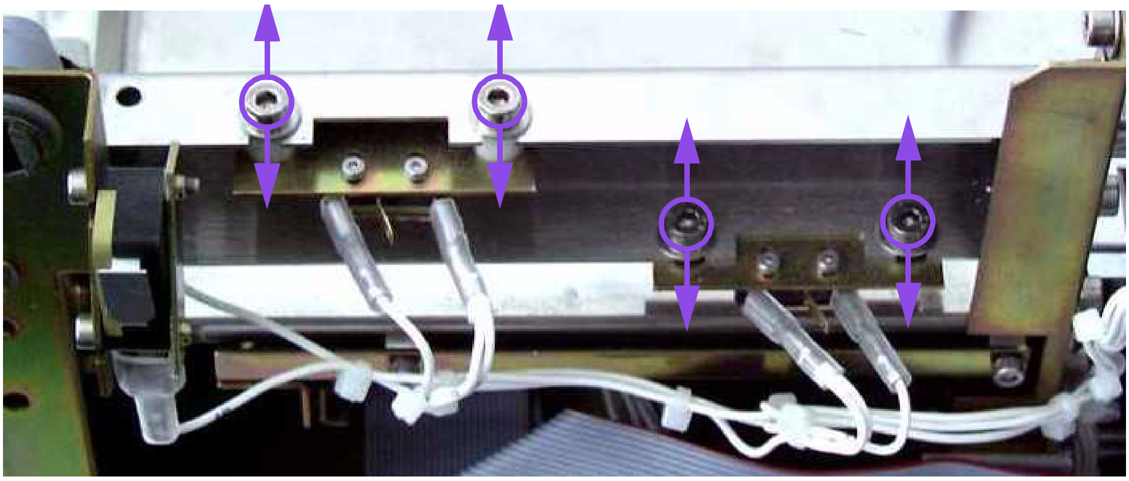
2. Sensors Adjustment

2.1. Loading area:

Stop Rack Loading Sensor Left (reference:XDA741AS).
Stop Rack Loading Sensor Right (references: XDA742AS).

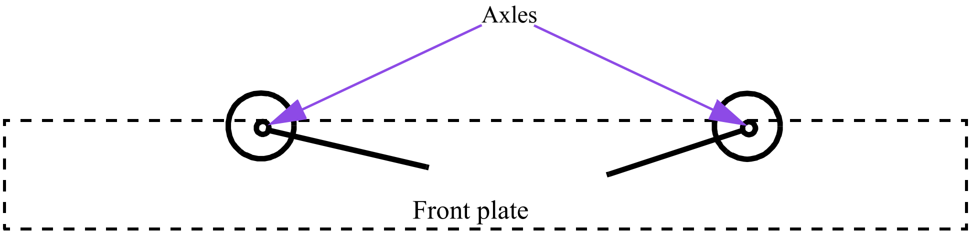
Adjustment of this two sensors is the same. This sensors are delivered on bracket and are prestressed. This adjustment is factory made.

Loosen the CHC M4x12 screws to adjust switch assy (switch + bracket + CHC M2x10 screws + flat nut).



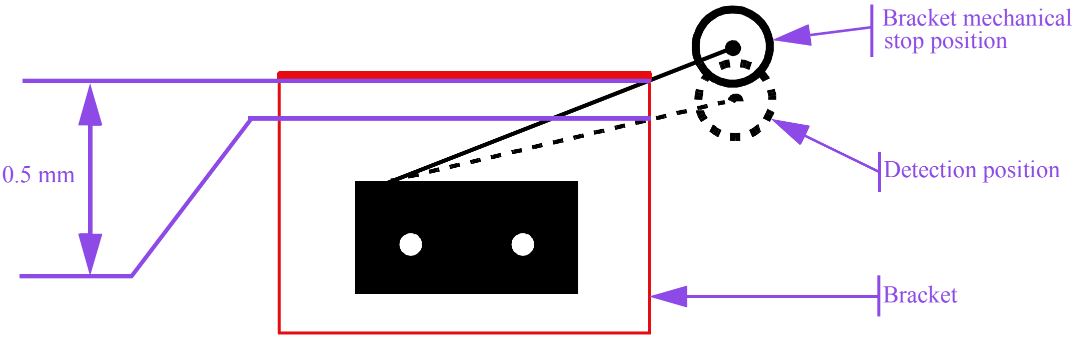
Diag.12: Stop rack loading sensors adjustment

The axle of the switch wheel does not hang out of the front plate in order to not damage switch when rack is moving back (See “Switch wheel position”, page 6).



Diag.13: Switch wheel position

If the switch as been moved on bracket, loosen the two CHC M2x10 screws and adjust it on bracket to have the detection after 0.5 mm of moving (See “Bracket / switch adjustment”, page 7).Plug a voltmeter in ohmeter positon between the two external pin to check detection. Reference switch alone: CAE019A.


Bracket mechanical stop position
Detection position
Bracket
0.5 mm

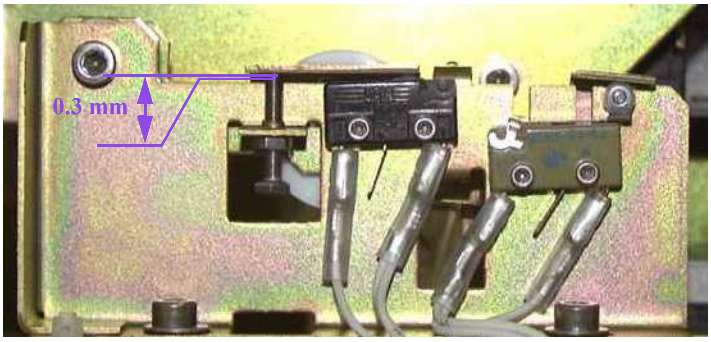
Diag.14: Bracket / switch adjustment

2.2. Sampler Transfer Rail:

Tube Height Control (reference: CAE10A).

Do not touch the TH M3x16 screw and HU M3 nut.

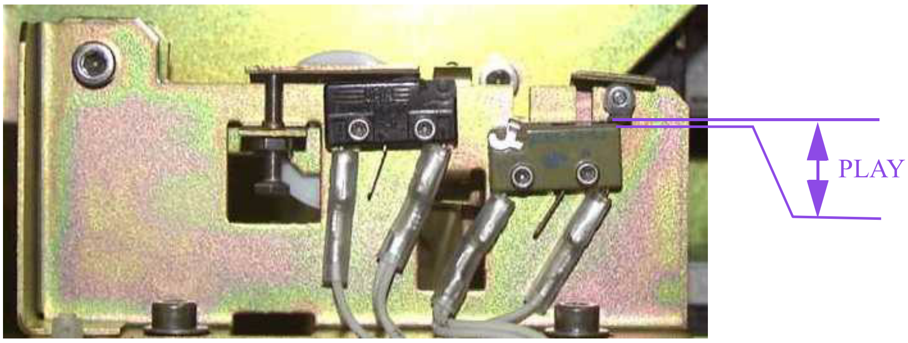
Unscrew the two CHC M2x10 screws and adjust switch to have detection in this position (See “Tube height control”, page 7) and no detection when you put a 0.3 mm gauge between TH M3x16 screw and the plate (See “Tube height control”, page 7).



Diag.15: Tube height control

Tube Sensor (reference: CAE011A).

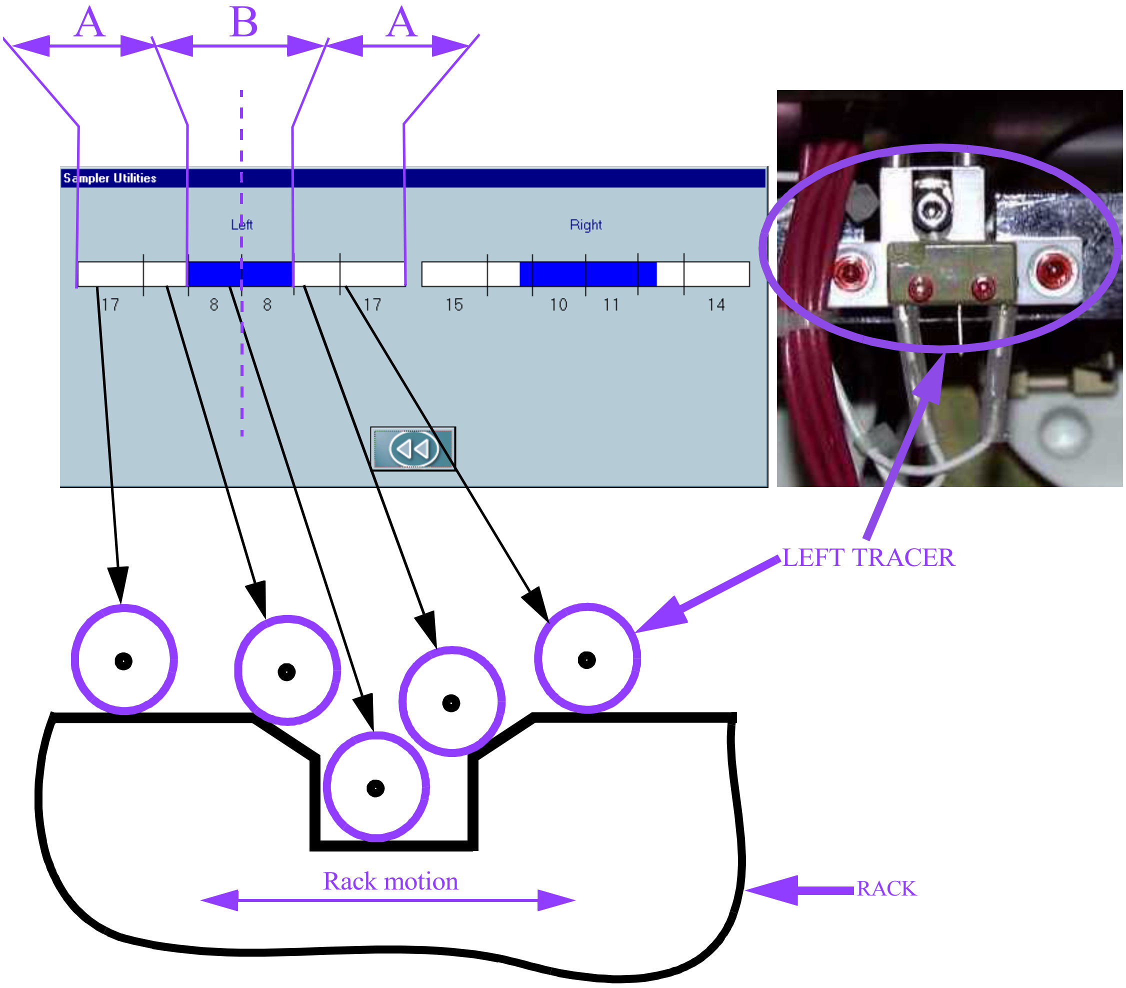
Unscrew the two CHC M2x10 screws and adjust switch to have detection when you push a rack with tube under the caster. Keep a little play in this position (See “Tube sensor switch”, page 7).



Diag.16: Tube sensor switch

Left Rack Locker / Right Rack Locker (reference: CAE010A).

Enter: **Menu\Service\Technician Menu\Gains\Sampler Adjustment**
Put the rack on Loading Tray.
Press **Check Rack Transfer Movement** button.
Rack moves under Tracers (followers), then it run 25 motions on the left and 25 on the right.
The following screen shows the detection (A) and non-detection (B) zones of the Tracer switches (See “Tracers detection zone”, page 8).



Diag.17: Tracers detection zone

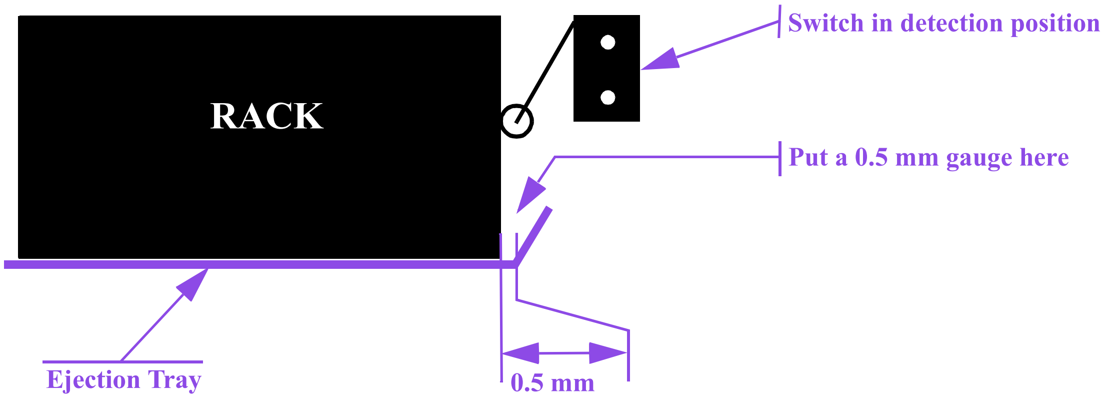
Non-detection zone (B) width is depending on tracer and on switch up and down position.

Loosen the two CHC M2x10 screws and adjust switch position:
If non detection zone (B) is too small, pull the switch down.
If non detection zone (B) is too large, lift the switch up.

2.3. Unloading area:

Rack End Transfer (reference: CAE011A).

Put a 0.5 mm gauge against Ejection Tray mechanical stop, then push a rack against this gauge. Loseen the two CHC M2x10 screws and adjust Rack End Transfer switch to have detection in this position, then screw the switch (See "Rack end transfer adjustment", page 9).



Diag.18: Rack end transfer adjustment

Unloading Area Full (reference:XDA742AS)

This adjustment is the same that Stop Rack Loading Left and Right Sensors. The switch is prestressed on the bracket (See "Bracket / switch adjustment", page 7).Reference of the switch alone: CAE019A.

Adjust the switch/bracket assy in order to be sure that the switch axle hang not out of unloading tray (See "Switch wheel position", page 6).
Press a rack against the left side of Ejection Tray (thermic panel side) and push it from the front to the rear. Adjust the switch / bracket assy in order to get detection when the rack comes in front of the switch. The Axle of the switch must not hang out of the Ejection Tray Plate in order to not damage switch if rack is, for example, manually moved.

Covers (reference: CAE020A).

Front cover, left and right (reference: CAE020A).

Unscrew the two CHC M3x12 screws and adjust switch position in order to have detection when covers are closed. Keep a little play beetween switches detection and switches mechanical stop.

Thermic Panel (reference: CAE006A).

Unscrew the two CHC M2x10 screws and adjust switch position in order to have detection when Thermic panel is closed.Keep a little play beetween switches detection and switches mechanical stop.

2.4. Waste:

Waste Control:

No adjustment available.

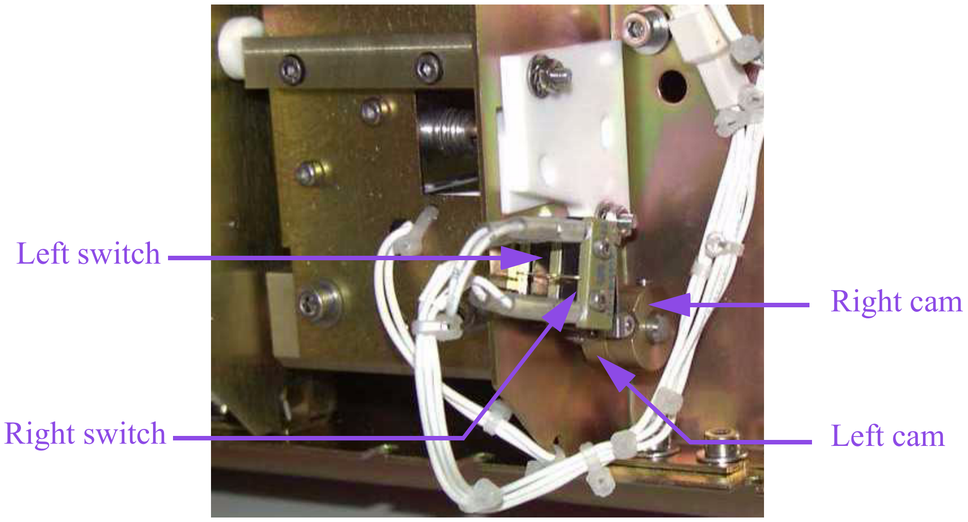
2.5. Others:

Tube holder cam (reference: CAE006A)

Open tube holder (completely) and adjust the wheel of the left switch in the «V» of the left cam, then screw the switches and the left cam.

Closed the Tube Holder and adjust the right cam to have the wheel of the right switch in the «V» of the cam, then screw gently the right cam.

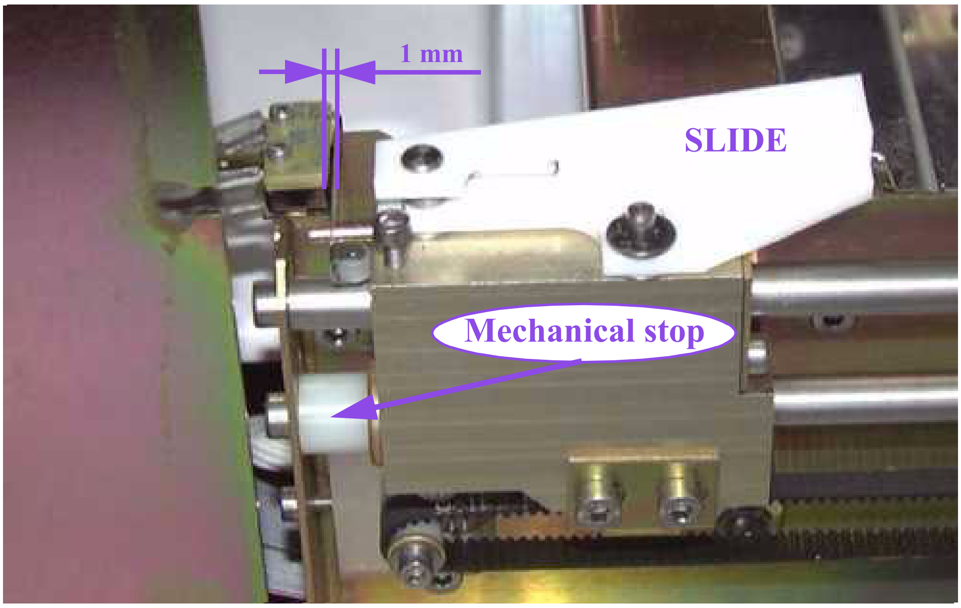
Open the Tube Holder, then close it again. Make sure that the switch detection comes at the same time of the Tube Holder locking and screw the cam.



Diag.19: Tube holder cam

Home Loader switch (reference: CAE019A).

Push the slide against the Mechanical stop (ring) and adjust switch to have detection in this position, and keep a play of 1mm on the switch (See “Loader switch”, page 10).



Diag.20: Loader switch

MDSS Technology pentra 80

Save and restore settings

RAS357AA

HORIBA ABX DIAGNOSTICS

- Concerns
  - Workstation setting save and restore
  - Analyzer setting save and restore

- Required tools

Floppy disk

- Required products

None

- Intervention time

30 min

- Frequency

On request

- Specific kit or consumables

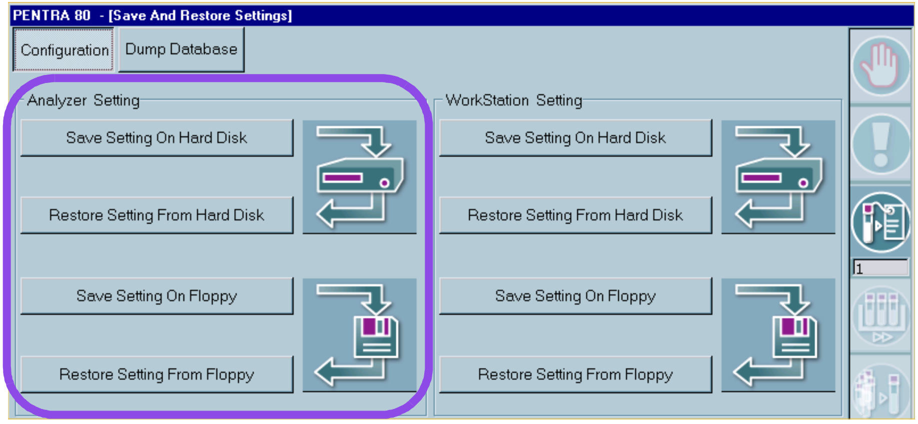
None

⚠ Disposal gloves and white coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

For analyser, the followings data are saved:
Cycles counter, Reference CTN values,Temperature recorded,Calibration coefficient, Motor Home and Motion Values, Needle Tube Holder Position, Window Counting and Reagent Levels.
For workstation, the followings data are saved:
Types, alarms level, Global Variables, limits level, pathological levels and the version number.

1. Analyser setting

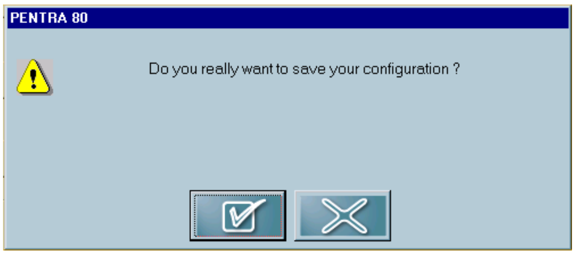
Enter: **Menu / Settings / Save-restore / Configuration.**


PENTRA 80 - [Save And Restore Settings]
Configuration
Dump Database
Analyzer Setting
Save Setting On Hard Disk
Restore Setting From Hard Disk
Save Setting On Floppy
Restore Setting From Floppy
WorkStation Setting
Save Setting On Hard Disk
Restore Setting From Hard Disk
Save Setting On Floppy
Restore Setting From Floppy
1

Diag.1 Save restore settings screen

1.1. Analyser setting save

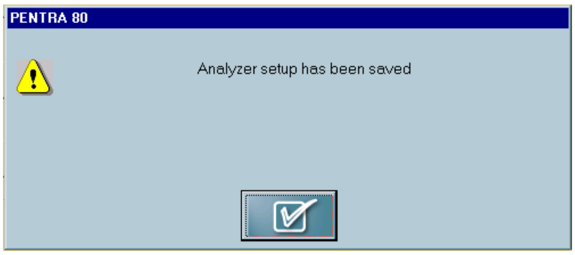
On Hard Disk:
Click on «**Save Setting On Hard Disk**» button to save analyser setting on hard disk (See Diag.1 “Save restore settings screen”, page 2).
Click on Validate button on following screen (See Diag.2 “Validate”, page 2).



Do you really want to save your configuration ?

Diag.2Validate

When the following screen occurs (See Diag.3 “setup saved”, page 2), click on validate button.



Analyzer setup has been saved

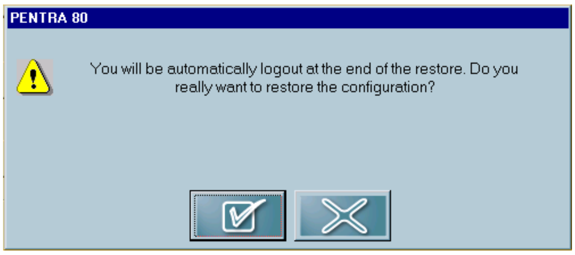
Diag.3setup saved

On Floppy Disk:
Insert a formated floppy disk in floppy disk reader then click on «**Save Setting On Floppy**» button (See Diag.1 “Save restore settings screen”, page 2) to save analyser setting and follow the same procedure than above.

If floppy disk is not formated, it will be automatically formated.

1.2. Analyser setting restore

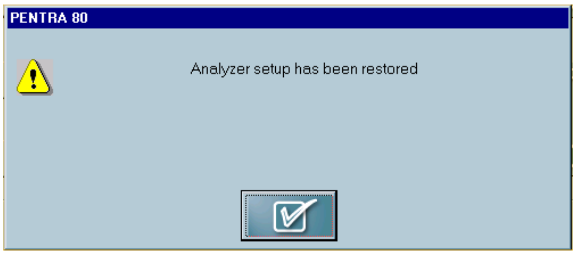
Click on «**Restore Setting From Hard Disk**» button to restore analyser setting from Hard disk (See Diag.1 “Save restore settings screen”, page 2).
Click on Validate button on following screen (See Diag.4 “Restore screen”, page 3).



You will be automatically logout at the end of the restore. Do you really want to restore the configuration?

Diag.4 Restore screen

Click on Validate button on following screen (See Diag.5 “Analyser setup restored”, page 3).



Analyzer setup has been restored

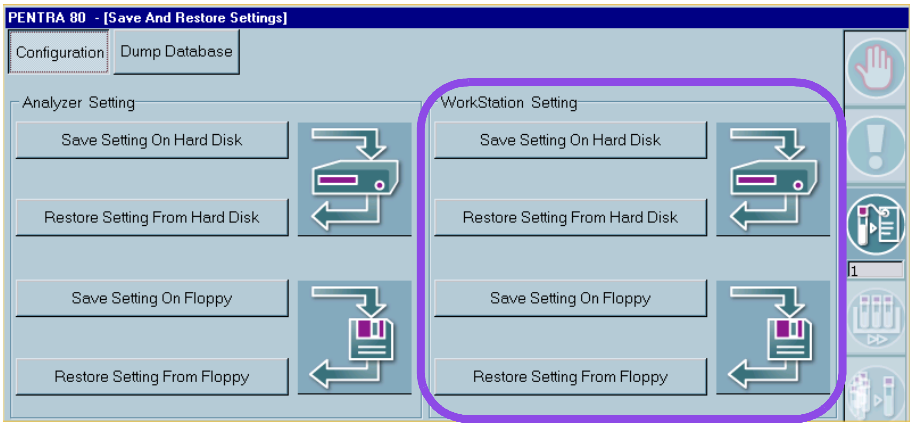
Diag.5 Analyser setup restored

After clicking on this button, you will be automatically logout.

Insert the Floppy Disk where setting has been saved.
Click on «**Restore Setting From Floppy**» button to restore analyser setting from a floppy disk (See Diag.1 “Save restore settings screen”, page 2) and follow the same procedure than for restore settings from Hard Disk.

2. Workstation setting

Follow the same procedure than for Analyser settings, but click on Workstation Buttons (See Diag.6 “Save restore settings screen”, page 3).


PENTRA 80 - [Save And Restore Settings]
Configuration
Dump Database
Analyzer Setting
Save Setting On Hard Disk
Restore Setting From Hard Disk
Save Setting On Floppy
Restore Setting From Floppy
WorkStation Setting
Save Setting On Hard Disk
Restore Setting From Hard Disk
Save Setting On Floppy
Restore Setting From Floppy
1

Diag.6 Save restore settings screen